ENCYCLOPÆDIA OF HOUSEHOLD ECONOMY

THE COMPLETE
Housekeeper

By

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ENCYCLOPÆDIA OF HOUSEHOLD ECONOMY

Chapter *ONE*

Kitchen Convenience

KITCHEN convenience is the key-stone in the arch of domestic economy which has come in large measure to spell human progress. If one could but make the nation's kitchens all they should be, there would be less need of amendment to its laws. The good red vital blood, from which is evolved winning brain and brawn, is, in the last analysis, good food. Good food in turn depends less on original quality than upon the skill and knowledge of the cook. Notwithstanding, skill and knowledge alone do not avail—there must be strength and proper equipment. Whether the cooking is the work of the house-mistress, or the maid, the best ways of doing it ought to be religiously followed.

The Floor

Like most other things kitchen convenience begins best at the beginning. That is to say, at the floor, which is the foundation of a cook's comfort. The ideal floor is of tile. Like the most part of ideals it is beyond realization by the majority. Next comes linoleum, whose thousand virtues are linked with the single crime of being too costly for at least half the kitchen of the commonwealth. Broad heavy oil-cloth, in tile or mosaic patterns, deserves to rank next, for wear, use, and cleanliness.

Cheap, staring, red-and-white oil-cloth is a delusion and a snare, no matter how dark and dingy the room it carpets. Chiefest among its manifold sins must be reckoned the facts that it shows both wear and dirt quicker than any other floor covering.

A detached, or a cellar kitchen, may be well floored with narrow brick, laid edgewise in cement, and rubbed smooth on top. Such a floor, well oiled twice a year, will not be unwholesomely damp. It is, however, so cold one should never stand directly upon it save in the hottest weather. A stone-flagged floor is among those blunders that are worse than crimes. Luckily it is so rare, it may be left out of account.

Nine kitchens in ten throughout these United States have bare board floors. Hence the question: "What sort of boards?" Nothing soft and sliver-y; neither anything that needs must be painted. The end of a kitchen floor is mainly to be scrubbed—and the paint proof against soap-suds and elbow-grease has yet to be discovered. Consequently a painted floor soon comes to look like a very ragged, and extra-chromatic Joseph's coat.

Narrow boards of heart-pine, well matched, well seasoned, free of sap-wood and wind-shakes, well laid, and oiled afresh every six months, make a fairish floor—the best board floor outside of the hard woods. In the hard woods it is a near thing between oak boards and ashen ones. Oak lasts a trifle longer; ash is the fresher and more sightly. Nothing, indeed, can well be more grateful to the trained housewifely sense than a well-scrubbed ashen floor, with all the grain showing upon the polished flesh-pink surface—a surface that years of good usage only freshen and deepen.

Neither oak nor ash wears appreciably in less than a generation—hence only the first cost needs to be considered. Ash takes a little smoother surface under the

plane, and is more manageable in laying—it should be driven up so tight that the cracks are practically invisible. Oak makes up for occasional roughness by having ever so much more spring. It is also cooler to the feet, and has the crowning mercy of yielding up grease-spots much more readily than ash. Its habit of darkening with age is also to be set to its credit.

Whatever the boards—whether hard or soft, wide or narrow, it is crucial to have them lie even. An edge standing the sixteenth of an inch above its fellows may occasion falls and stumbles innumerable. A creaking board, "a bird in the floor," as country folk say, is little short of a nervous torment. A nail-head projecting ever so slightly is a positive danger. So, too, is a splintered crack. So most of all is a dry-rotted board, the best trap yet devised to catch and breed all sorts of moulds and mildews.

Hence those who needs must put up with hired kitchens may well look to these things: Whether the kitchen floor is firmly laid? Are the cracks in it conspicuous by absence? Does the base-board fit snugly down all round? Are there anywhere cracks, crannies, and crevices, as behind the stove, under the sink, or about the door-jambs, in which mice can lurk, vermin harbour, or such small deer as thimbles, laundry-wax, bread crusts and crumbs, even an occasional potato-paring, can engulf themselves past finding.

It is, of course, the landlord's province to remedy all these things. He will promise—it's usually left the householder to perform. So it is a saving of nervous energy to do it one's self at first hand, even though it be but in makeshift fashion. Do not grudge a few nails to hold the loose board firm, nor the strip of smoothed quarter-inch stuff that closes the yawning base-board crack, neither the putty and plaster which fill irregular crevices —putty on the scouring-line, plaster higher up. Putty

is commonly cheap—three to ten cents a pound. A single pound often works wonders, and five pounds of it is an outside estimate for the most ramshackle kitchen, which may thus be made trimly habitable by the outlay of a few cents. Still it can be made even cheaper than bought ready mixed. Since it keeps perfectly, requiring only to be beaten up afresh with a little oil, it is a handy and valuable thing to have about the house. (See Chapter on Repairs and Restorations.)

A thick springy mat, as cocoa-fibre, corn-husk, woven rope, in front of the sink, will save much wear of the kitchen-floor and the cook's nervous energy. Standing is notoriously among the hardest forms of exercise, ever so much more exhausting than walking, or even running. All the harder if one stands upon a dead unyielding surface. Since a cook needs must stand more than half the time, beyond any other worker, it behooves her to deaden the pressure upon feet and spinal column. The elastic mat is a help. A greater help is a length of the thickest cocoa-matting stretching from the sink to the range, and passing the table on the way. It should not be tacked down, neither left at loose ends to curl and trip the unwary. Have the cut ends clamped fast with strips of doubled tin, beaten flat, and riveted through matting and all. Thus the matting always lies flat, with no possibility of dirt accumulating underneath. It may be cut in squares, or to rug-length—any way, indeed, if the ends are duly tinned. With a roof or back yard available it can be beaten like other rugs. Upon ironing-days, one bit laid upon another under the ironer's feet will save much in power, and, consequently, in time.

Floors are made to be scrubbed. Notwithstanding, the daily, even the weekly, scrubbing, is a fetich that should go. With reasonable care fortnightly is often enough, and where the family is small, once a month may be made to answer. In the matter of grease-spots pre-

vention is much easier than cure. When frying is to be undertaken, lay newspapers all about the range. Take the same precaution upon baking days. Flour is cleanly in itself, but the most insidious of all things. It sticks in the least crevice, and draws to itself all manner of dirt. Lay the newspapers smoothly, two or three ply. If they catch much grease it makes them all the better tinder for lighting the next range fire.

Walls and Ceiling

Since kitchens exist it is plain they must have walls —at least outside the happy tropics where the kitchen wall is the sky-line. As with floors, cost puts tile out of court, also vitrified brick, unless the purse-strings are strong, yet easily opened. Wooden surfaces, either in ceiling or wainscot, are objectionable, in that they absorb dampness and odours, besides affording harbourage to vermin, and lurking-places for dust, visible and invisible. Smooth, hard-finished plaster is far and away better. The plaster should come down almost flush with a plain, well-smoothed base-board, at least a foot wide. Give the wall, base-board, and all a yearly coat of light, fresh-coloured paint. With new plaster wait a year before painting. Otherwise the lime in the mortar will bleach out the colour of the paint.

Many of the patented hard-finishes answer excellently for kitchen walls, but are no more durable, nor hygienic, than the plain, painted plaster. Such walls and ceilings can be washed at need without damage or resulting dampness; further, they do not collect dust, nor absorb odours. Grease which volatilises in a degree from every sort of cooking, and is deposited upon the walls, does not penetrate the painted surface. Hence washing removes it entirely. Indeed, with a well-painted wall, a minimum of care keeps it fresh the year round.

Windows and Doors

A high ceiling helps in ventilation if the windows run up very near it. When the top of the upper sash is two or three feet lower, it is well nigh impossible to rid a kitchen of stale smells. The smells rise with the hot-air column above the range, and spread and hang in the upper air, always twenty to forty degrees warmer than the body of the room. When the fire dies down this warm air cools, slowly to be sure, but enough to let down whiffs of the composite smell, reminiscent of yesterday's breakfast, or last night's dinner. A sash almost flush with the ceiling, when lowered acts as a flue to carry off such exhalations. Failing such a window the low ceiling is best—then the ordinary kitchen stir, opening and shutting of doors, etc., set up a circulation of air strong enough to weaken if not to banish the ghostly smells.

A transom above an inner kitchen-door is a ticklish thing. If it is open every motion below sends waves of hot smell impinging gently upon all the world outside. Heated air expands as well as mounts, and owns, in an aggravating degree, the universal fluid tendency to seek its own level. Bearing this in mind it is easy to see why kitchen-doors leading in should be as low as architecture permits, and outside kitchen-windows run up to the ceiling. With two kitchen-windows it saves wall space to turn one cross-wise, leaving a place beneath for either a closet or an open dresser, and giving more light and air. All kitchen-window sills should be high—high enough at least to have a table set beneath. Thus is convenient arrangement promoted, and the range saved from losing heat through direct draughts upon it. Screen all kitchen-windows, if only with cheese-cloth or mosquito-netting. Wire-gauze is of course much better.

Ordinary crown glass, in medium sizes, is best for kitchen-windows. Then a broken pane can be cheaply

and easily replaced. Both sash and screen-frames should be painted white, particularly where there is a poor light. If painting is out of the question use the quick-lime whitewash, which will stick to even planed wood without flaking, if the wood is first washed clean of grease. (See Whitewash in Chapter on Repairs and Restorations.)

Kitchens need careful fitting in the matter of doors. Sliding doors warranted to slide would be a boon beyond price. Since the average sliding door is built to stick, not to slide, it is better left out of the calculation. Doors giving upon the rest of the house had better open outward. Thus in shutting they force back kitchen smells within their proper domain. Broad cracks betwixt doors and casings can be filled with strips of soft wood, bradded firmly on, and stained, or painted, to match. Cracks in the door itself should be filled with putty, likewise knot and nail holes. Loose panels can be plugged tight with the same useful substance. Warped moulding should be taken off, steamed soft, and fastened in place with brad-nails. Unless the hinges hang true, call in the carpenter at once. See to it that knobs turn easily, and that bolts catch firmly enough to hold at the first shutting.

There are no trifles—least of all in the kitchen. It is only the door firmly shut which will bar kitchen smells from the rest of the house, saving time and nervous energy—which neither mistress nor maid can afford to waste. Therefore, it is well to have outside doors open inward, and further to see to it that they have some protection from the weather. Even a rough hood, with only a broadish step below, is much better than going directly out upon the ground. A screened porch or covered gallery is better still. This, of course, for householders and builders.

For the flat-dweller there is somewhat of comfort in this device. If the kitchen-door opens inward, giving directly upon the hall or dining-room, hang washable

draperies, from a small brass rod, set flush with the outer casing, and as close as possible to the wood, but two inches above the door. Use denim, art linen, or even momie cloth, a length each side. Thus it is easy to pass through, and the curtains falling behind make a sort of air-shield. They need not be unsightly, and a quarterly washing will keep them fresh.

Controlling Kitchen Odours

Odours are subtle, withal searching. In dealing with them an ounce of prevention is worth at least a ton of cure. The heavy smell of stale grease, most clinging and most offensive of all, comes more than anything else from slopping or sputtering over, which a very little care in range management prevents. The acrid smell of burnt or scorched things is positively painful—so much so a cook's first lesson ought to be that fire was given for *cooking*, not burning. Leaving unwashed pots and stew-pans to dry and simmer on the range is a fruitful source of ill-odours, easily remedied. Dissolve two pounds of washing soda in a gallon of boiling water, and keep a bottle of it handy. As cooking vessels are emptied pour in soda water an inch deep, shake it well up around the sides, and leave until washing time. If the pots and pans keep warm so much the better—the soda will but do its work the more perfectly.

Onions, turnips, and all the cabbage tribe, which smell to heaven, may have their scent somewhat abated by a little care in the boiling. The odour comes from their essential oils, which volatilise. If the vegetables are prepared some hours before they are wanted, and left to soak in weak, cold, salt water, rinsed, and put over the fire in fresh, cold water, they throw up this essential oil largely in the form of scum. Let them come to a boil before putting in the salt, and skim very clean. After the salt is in

add a dash of cold water—it will throw up a second scum, which must be removed at once. Cook all such vegetables uncovered—a lid strengthens the odour tenfold, and makes it more offensive.

Another preventive is a bread-crust, very hard and very stale. Drop it into the water just as it strikes a boil, and let it stay ten minutes, then skim it out. Most of the oil will come with it—further, the spongy crust will have kept it from vaporising. Cauliflower not quite fresh always smells tremendously. The best thing for it is a scald in weak salt water, boiling hot, before the cold soaking. If the heads are big cut them in pieces so as to make sure of removing every bit of discoloured curd.

Even when summer heat puts an open fireplace out of commission a quick flare, as of straw, excelsior, light shavings, even newspaper, will set up a purifying draught, and help to free the kitchen of unpleasant odours. Failing an open fireplace the kitchen ought to have a range-hood. There are hoods and hoods—at almost any price one chooses, from the big burnished copper affair, which saves the Waldorf-Astoria from cooking smells at a cost of many hundred dollars, to the modest sheet-iron contrivance, which is an integral part of so many among the newest stoves. There is a movable hood, working up and down like the shutter of a roll-top desk, that is, in theory, all a hood ought to be—with something to spare—but in practice has proved much less satisfactory than the stationary ones.

No mechanical contrivance can wholly make up for the lack of care and intelligence in the cook—notwithstanding, it is a fact, that a hood well set, in a large measure, carries away the fumes of food. The manner of setting will depend on the size and location of the flue. The lower edge ought to be high enough to be quite out of the way, yet not so high as to either miss or deflect the ascending hot-air column. It may seem at first

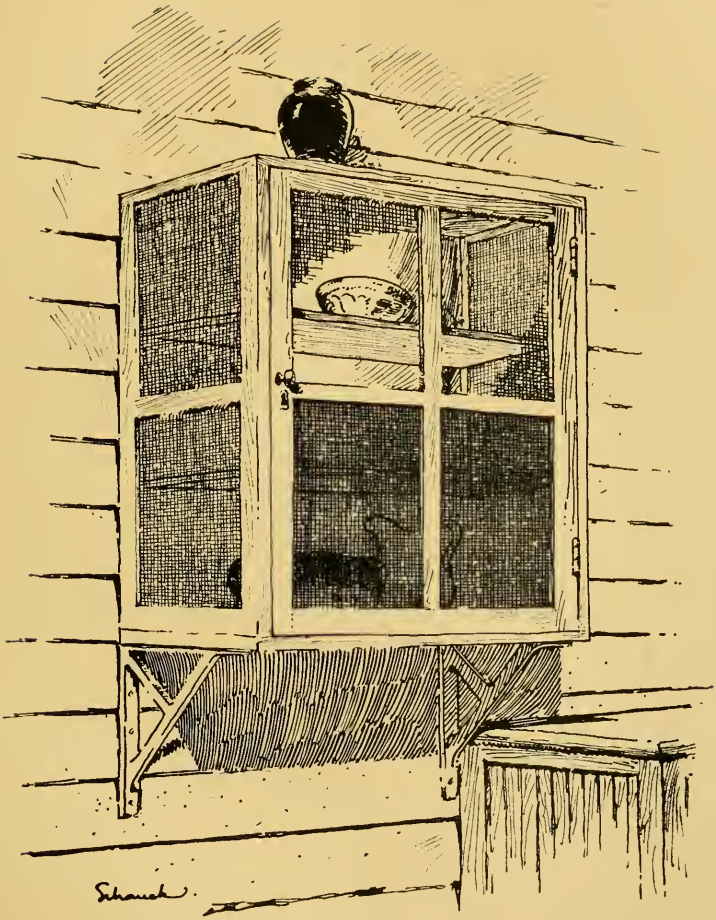
a costly betterment, for no direct material benefit, but a year's use will show the money to have been well spent. Not to name present and every-day comfort, all things keep much better in a well-aired house.

A kitchen with neither hood nor fireplace should at least have a trumpet-ventilator. This is only a tin tube with a widely flaring mouth, crooked body, and narrowed upper end. It should be set in the wall above the range, with the flaring mouth, which curves over and upward, against the ceiling. The narrow end goes inside the flue, projecting just enough to secure a good draught. The efficacy of this device, a make-shift at best, depends mainly upon the size and smoothness of the flaring mouth, and the tightness of the setting in the flue.

A Fresh-Air Closet, Sink, Draining-Board

Take stock of the kitchen intelligently. Consider well its possibilities, then set about realising them. With a hall or porch handy try to put the ice-box there. Give it the best light possible, and as much fresh air. Close beside it fix a fresh-air closet—which, save in the most torrid weather, keeps cooked food better than the ice-box itself. It demands only to be out-of-doors, away from the sun's direct rays. Hence it is as much a boon to the flat-dweller, with a shady fire-escape or north-looking window, as to the people who have houses all to themselves.

Anybody who can drive a nail can make one, at a cost not to exceed a dollar. It is only a framed box, with door and sides of wire-gauze, and shelves across inside. It is best made fast to the wall at such a height as to be safe from prowling cats, and should have further a trusty lock. Put away food in it, in clean earthen dishes, never in any sort of metal, not even silver; slip each dish into a separate cheese-cloth bag, and twist the bag end tight.



If ants, black or red, discover the closet, paint the woodwork all outside with camphor once a fortnight. Twice a year take down the whole contrivance, and scald it outside and in, with boiling soda water.

The range and sink are commonly fixed facts. Make the best of them by a handy location of the kitchen-table. But first a word as to sinks. Refuse to live in the house with anything less than solid cast-iron. The wood-and-zinc abominations, found in many old buildings, breed bacteria enough to the square inch to poison a regiment. The cast-iron sink with cast-iron back is ugly but can be kept clean, and, with reasonable care in the setting, will be wholesome. Further, it can be so painted as to relieve some part of its ghastliness. But it is not to be named along with the porcelain-lined sink, which has a tile backing and invites to cleanliness. The porcelain-lined affair in turn hides its diminished head before the solid porcelain—whose one drawback is its cost. The smallest and plainest are $22.00—thence the price mounts till it is well in the hundreds. But to any born housewife the cost seems a good spending. Certainly such a sink conduces more to family comfort than a Brussels carpet for the parlour, or even a cabinet organ.

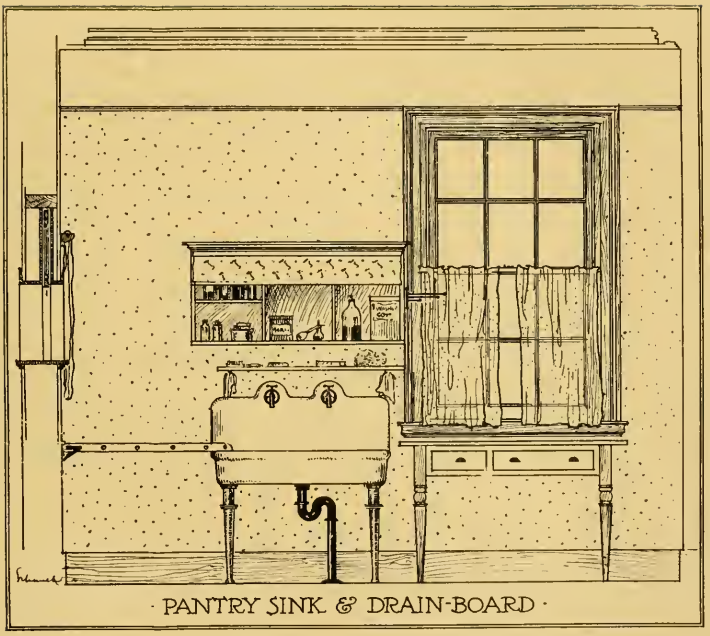
Any sink—always excepting the wood-and-zinc one—is better than none. It should be built in the wall, with the plaster coming so snugly around the back that the most enterprising and venturesome water-bug can find no place to hide. It should stand level upon its legs, but slope very slightly toward the drain, and have all the space beneath open to light and air. Above the sink-back, fasten to the wall a narrowish tray of either wood or metal, with a perforated bottom, and nearly as long as the sink is broad. In this tray keep hand-soap, scouring soap, a nail-brush, a vegetable brush, sponges, etc. In the middle, and at either end, set a blunt hook for hanging wash-cloths. They must neither touch the faucets nor drip

on them. In passing it may be said that a wash-cloth or dish-cloth should be kept spotless. When either begins to fray burn it at once.

Well above the tray have a wall-closet six inches deep, and a little broader than the sink. Keep in it every sort of cleaning stuff—ammonia, soap-powder, dry washing soda, pearl-ash, whiting plate-powder, flannel and linen rubbing-cloths, chamois, and polishing-leather. Bath-brick also, along with lime-water, floor-wax, and furniture-polish. It is well to have the upper shelf divided into compartments, each plainly marked with the name of the thing it holds. Those in daily use should go upon the handy lowest shelf. Doors to such a closet are out of the question—in swinging they strike a grown person either in the temple, on top of, or beside the head. Either leave your closet open—which is not at all desirable—or close it with a roller-door, or curtains running on draw-strings.

The curtain should be of any stout washable stuff, with a slat at the bottom, and tacked across the top to a shade-roller, working in shade fixtures made fast to the closet's upper edge. A regular window-shade may be used, shortening it, of course, and wiping it off inside and out fortnightly. But something opener is much more desirable. A curtain of lawn or cheese-cloth, with draw-strings down each side, is not at all bad. The strings should have long ends, working over a rod across the top. A single pull at them whisks the curtain up clean out of the way. The ends should be joined together and passed over a hook in the bottom of the closet, well toward the back, so as to hold the curtain up.

Hang a roller-towel of generous proportions close beside the sink, and see that the towel proper is changed every day. For dish-towels, provide a fingered rack, made fast to the casing of the sunniest window. Thus the towels get full benefit of light and air, the best of



PANTRY SINK & DRAIN-BOARD

all disinfectants. The cheap fingered racks are commonly too fragile, and the stout ones too costly for kitchen use, but any carpenter or man handy with tools can make an excellent one at the cost of a few cents. All that is needed is square inch-stuff, sawed into two-foot lengths, the corners and one end slightly rounded, with half-inch holes bored in the rounded ends, so the fingers may be strung upon either a wooden peg, or an iron bolt, between two wooden brackets, nailed fast to the window. Such a contrivance may have as many arms as one pleases. Five is a good number. In use they are spread out fan-wise. Out of use they rest peacefully flat against wall or window.

A draining board is a great help in dishwashing. Where it is lacking a big tray with a soft folded cloth, as an old table-cloth, laid over it, is an excellent substitute. The cloth minimises danger of breakage as well as takes up the drainings. It should be wrung out whenever it shows itself sopping wet. A right-hand draining board is most convenient, but it should never be divorced from the kitchen-table or the pantry-window. It saves a world of work and miles of walking to have a sliding-panel window betwixt kitchen and pantry or dining-room. Have the panel big enough to reach the whole arm through—with a table underneath it inside, the problem of putting things away is mightily simplified. Another kitchen problem is where to set the table. No matter what the solution, the solver commonly ends by thinking much might have been said—and done—on the other side. Flat against the wall it permits the hinged bread-board, with shelves above for flour and sugar tins, the lard pail, the cake and bread-boxes, and in the extra space, a wall cupboard, sacred to spices, flavorings, nuts, dried fruit, baking soda, cream tartar, baking powder, yeast cakes, gelatine, citron, what not. There, too, is the place for cake and pie tins, fancy moulds, patty pans, ramekin cases, vitrified china baking-dishes, delicate mixing-bowls,

egg-whips, and custard-spoons. Thus equipped a cook can toss up things almost without moving from her tracks. Notwithstanding, she is haunted by visions of a corner-cupboard possible with the table sitting diagonally out. The corner-cupboard means so many convenient things—shelf-room above for what one will, zinc-lined bins below for sugar, flour, and so on. All these at hand by simply turning about, since the table must stand far enough out for one to work behind it. Where space is plenty the cupboard has unquestionably a shade the best of it. One can stir and beat more energetically, hence more effectually, if there is no need to have regard of the wall.

Ranges, Shelves, and Closets

Fifty years back the most part of these United States did their cooking and much of their heating with wood. The wood-stove, in capable hands, unquestionably turned out miraculously good things. Still, eternal vigilance was the price of them—it was impossible to count certainly upon more than ten minutes of steady and equal heat from the best of them. So it is matter for rejoicing that the coal-range abounds, the gas-range is cheap, plenty, and effectual, and the oil-stove has ceased from smelling vilely, and gone regularly into business. As to choice betwixt the three, for a medium or large family, with laundry work done at home, a coal-range is best throughout eight months of the year. Throughout the other four it is a refinement of cruelty to keep the kitchen and the cook's temper at simmering heat, with the thermometer playing acrobatic tricks the while. A very little money will provide an oil or gas range, either of which anybody can learn to manage in half an hour. Comfort wholly aside, either will save its cost in fuel the first season. Coal once afire must burn on. If it is

dumped the cinders are ill and costly to re-kindle. With oil or gas contrariwise, matches are the only kindling, and no more need be burned than just suffices for the cooking. Moreover, it is unnecessary to heat the whole range to make tea or boil eggs and coffee.

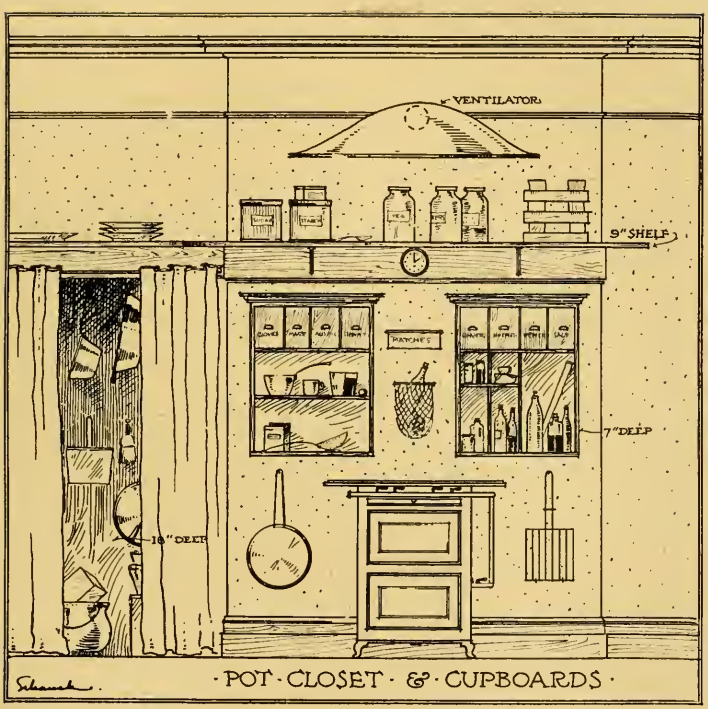
The cost of cooking with oil depends upon the local price. In a general way it is safe to reckon that a gallon of good oil will keep a blue-flame burner of the highest power going at full head for nine hours. With reasonable thrift, three to four gallons of oil ought to do a week's cooking, besides boiling clothes and ironing a moderate wash. Gas is a trifle more convenient, and in places cheaper, but everybody cannot burn gas. Oil has literally the world for its parish—even the Great Desert and the remote Klondike.

Concretely, the range, whatever its breed or pattern, is the most potent factor in kitchen convenience. Sometimes it lurks in a recessed chimney with a boiler standing stark at one side and a wall running up on the other. Then the cook has need of patience and commonly deserves a martyr's crown. Oftener it is thrust in high relief against the chimney-breast or set a little way off the wall, with the pipe running well up toward the ceiling. Either way, it is unlikely the kitchen makers and builders saw fit to do more than leave bare wall behind it. Right there opportunity offers, since nowhere else is space of so much value. Begin to utilise it with a broad shelf all the way across, as high up as one can reach. If the pipe interferes have the shelf cut out to accommodate it—of course taking care not to let the wood come close enough to be in danger of scorching. A shelf fifteen inches wide, well and stoutly braced underneath, will hold the things that need to be kept warm and dry—as rice, cereals, beans, starch, bar-soap—it goes a third farther for hardening—vinegar, salt, pepper in the pod, crackers, bread-crumbs in glass jars, tea, and

lump sugar. All but the soap should be in tin or glass and plainly marked. Pile the soap-bars cob-house fashion and do not cover them. Hang a light, cheap clock from a screw-hook set underneath—thus, at a glance, everything can be timed in the cooking.

Below the big shelf, upon the side next the sink, have three narrower shelves, with a roller-door. There keep all the light kitchen artillery, sauce-pans, skimmers, strainers, flesh-forks, larding-needles, cake-turners. Over against these three shelves, upon the other side of the range, have a cabinet, cut into spaces for all sorts of condiments and flavourings. Label each compartment and keep everything in place. The flour-dredge belongs there, the salt-shaker, the pepper-casters, tarragon vinegar, onion-juice, garlic in clove and in essence, celery-salt, fine herbs duly powdered, mushroom, walnut and tomato catsup, paprika, tabasco, capers, and gherkins for garnishing, port wine, sherry, claret, and brandy; mustard, dry and made, grated horse-radish, and grated cheese. In the compartment next the range set a graduated measuring glass and three box-wood spoons—salt, tea, and dessert sizes. Seasoning over the fire, which is one secret of delicate flavours, is easy to a cook thus equipped. The cabinet should have a roller-door like the shelves. In the bottom of both shelves and cabinet there ought to be blunt screw-hooks for hanging holders of all sizes. It is a heart-breaking choice betwixt burning a hand badly or spoiling some especially dainty dish by five seconds over-cooking.

With a gas-range fit into the space between shelves and closet the biggest double match-box obtainable. Matches are ever so much cheaper than gas. Jets should be extinguished when not needed, though they may have to be relighted five minutes after. Good matches, and beautifully plenty, are essential to peace and a quiet kitchen. So is a holder for burnt matches. Most of the


VENTILATOR
9" SHELF
7" DEEP
18" DEEP
POT · CLOSET · & · CUPBOARDS

ready-made match-safes are so ridiculously inadequate it is well to have the plumber or tin-smith make something approximating, in metal, the pocket shoe-bags of our grandmothers.

Somewhere on this back wall contrive a space for a wire bottle-rack in which to set the bottle of soda-water. It is a friend in need and deed, first, last, all the time, since it helps so largely to keep the sink clean and unclogged. Once a week a whole bottleful ought to be poured down the sink-drain after dish-washing is over. Chain dish-cloths need a scalding in soda-water at least once a month.

A movable dresser is desirable, but lacking it shelves across either a corner, or the recess beside a chimney flue, answer excellently. Have the lowermost shelf twice as broad as those above, and hang a washable curtain from it. This gives a good pot-closet. Fill the open shelves with platters, bowls, brasses, indeed whatever ware belongs specifically to the kitchen.

Whatever else it may lack a kitchen should have one comfortable chair, and a smallish solid-standing table with one or two drawers. Set both as far from the range as light and air permit. The table is for cook books, account books, receipt books, a work box, shears, tape, and binding twine. Fasten a small slate to the wall just above the table, and hang a bit of pencil to the frame underneath. The slate is a kitchen record—for things to be bought, things in need of special attention, hours of extra serving, time of putting things over the fire—indeed it has uses too numerous to specify, and is as much a help to the mistress as the maid.

A chiffonier or clothes-press is handy to have about a kitchen, if there is room for it. Have one drawer for caps and aprons, another for dish-towels and holders, a third consecrated to jelly-bags, pudding-bags, roly-poly and tamise cloths. All of these last ought to be soaked in

tepid water an hour after using, then well washed, boiled, thoroughly dried, and aired for a day before putting away. Never use either without scalding it well, then swishing rapidly for a minute or two through clean cold water. Pudding-bags and the like must in addition be well floured. The corners of them must be rounded, the seams strongly sewed, bound with white tape, and left outside in the boiling. Nets are better than cloths for boiling dumplings. Treat them the same as cloths, or they will grow musty.

Chapter *TWO*

Repairs and Restorations

MAKE haste slowly in the matter of repairs and restorations. It is not meant by this to let the work drag, but never to undertake it until everything is ready, nor to lay a hand to it amid a press of other work. Movables in need of repair, as chairs, tables, picture-frames, broken china, bric-à-brac, and so on, ought to be gathered into a place apart, where they can remain undisturbed until their hurts are healed.

Every household, no matter how small, will be better off for possessing this outfit of tools: hammer, tack-hammer, hatchet, hand-saw—fine rather than coarse—screw-driver, monkey wrench, brace and assorted bits, pliers, wire-nippers, gimlets in three sizes, foot-rule, square, small plane, small trowel, putty-knife, and two or three brad-awls. In addition, it pays to keep always on hand wire nails, assorted sizes, screws from half an inch to two inches, light bolts and taps, screw eyes, screw hooks —these are best of brass—picture hooks, picture wire, sand-paper, putty, plaster of Paris, Spanish whiting, brad-nails, rivets, a soldering iron, and a pot of glue. Ten dollars at the outside, carefully expended, will supply everything mentioned. Often the investment may save a hundred in course of a single season. Especially if the investor lives in the country or the suburbs, where repair men are commonly so full of business, it makes them

high and haughty, withal, disagreeably independent. Even in city homes the repair-kit is handy to have about the house. To the flat-dweller it is a positive boon, since it makes one in large measure independent of autocratic janitors, besides saving much in money and worry through the proverbial stitch in time.

Lime, another essential of most repair work, is best bought as it is needed. It will air-slack no matter how dry it is kept, and quick-lime is ever so much more effective. Either dry, or in the form of whitewash, it is the cheapest, best, and cleanest, thoroughly safe disinfectant. Every underground space needs a yearly coat of it. An earthen cellar-floor ought to be whitewashed the same as the walls, and, when dry, covered with loose plank wherever there is need to walk or stand a long time. To leave the floor untouched is to invite and harbour all manner of taints. Cellar whitewash must be as thirsty as possible; thus it helps to keep the cellar air clean and sweet. There are as many ways of making whitewash as of foretelling the weather. This is the best way, if it is to go underground.

Cellar Whitewash

Tie a gallon of wheat-bran loosely in very thin cheese-cloth, and boil it for five hours in five gallons of water. As the water boils away, add more. Take out the bran, squeezing it well, and dissolve in the boiling size two ounces of carbolic acid. Stir well, then put in a gill of liquid Prussian blue; stir again, then add half a peck of unslacked lime. Stir, strain through a coarse sieve, and apply hot. It is best to take out a gallon at a time, leaving the whitewash-pot where it will keep hot but not boil. In applying to wood, move the brush with the grain wherever possible. Do not try to whitewash a very greasy spot without scouring. The wash will cover it

up, but in a week will begin to flake and crumble. Walls previously whitewashed need to be swept very hard with a stiff broom so as to remove all loose flakes. Brick-work or rock will take twice as much whitewash to the square yard as wood. It is poor economy to scant or skimp, especially at cracks or along seams of rock-wall. Have two brushes, one long-handled, one short, with a stubby round paint-brush, for use in crannies and tight corners. Grease the hands very well before beginning to work, and protect them further with gloves of leather or rubber, coming as low as the fingers. Whitewash from the top downward, and, in working upon the ceiling, keep well back of the brush, on pain of getting a splash of whitewash in the eye.

Out-Door Whitewash

This is excellent for fences, walls, out-buildings, sheds, trellises, rough porches, or orchard tree-trunks in need of protection from vermin. Break up a pound of clean glue in an earthen jar, cover it well with cold water, and set the jar in a vessel of boiling water. Keep the water-bath simmering until the glue is all dissolved—it should be clear, and rope slightly. Next morning heat it well, then stir it through six gallons of hot water. Add a pint of salt, and when it is thoroughly dissolved pour the liquid, boiling hot, upon one peck of unslacked lime in a clean wooden vessel. Stir hard for ten minutes. Add a little Prussian blue if wanted a clear white. Two ounces of chrome-yellow rubbed smooth in a cup of the wash, then well mixed with the mass, will give a lively cream-colour. Lamp-black sifted in makes gray, dark, or light according to quantity, and Spanish brown gives a dull pink, but requires to be carefully mixed, or it will stay in lumps, and give a spotty colour. This whitewash will stick either hot or cold, and keeps well for some time.

It is much better to put it on on a clear, warm day than one either cloudy or damp. Once the glue dries and takes firm hold it is not easy to get it off, but, unless it dries quickly, it will neither look nor last its best.

Milk Whitewash, or Quick-Lime Whitewash

This is a good substitute for white paint inside the house, since it sticks to wood, planed or rough, and rubs off very little. Powder and sift quick-lime without slacking, stir a quart of it well into a gallon of sweet milk. It ought to be a little thicker than cream. If too thick, add more milk; if too thin, more lime. After mixing thoroughly, add a teacupful of turpentine, stirring hard as it goes in. Apply with a paint-brush. This is excellent for ceilings, upper walls, the inside of kitchen closets, pantries, dairies, and so on. It can be tinted like the out-door whitewash, but is of so soft and clear a white it is more agreeable without colouring.

Prepared kalsomine cakes are so cheap, and so easily bought, it seems hardly worth while to say that the dissolved glue, with the addition of Spanish whiting—sifted, of course—and an earth-colour in powder, makes a kalsomine finish for walls. Apply with a paint-brush, and give at least two coats. Three will be better. For the first, thin the liquid kalsomine one-half with water just below boiling heat. Let this coat dry, then put on a coat of thick wash, but without colouring. Colour the last coat, and thin it a very little. It is best to try a brushful upon a shingle or waste-wall before finishing, as the colour lightens so in drying it is otherwise impossible to judge accurately the depth of the shade.

Step-ladders are kittle-kattle when it comes to working with a ceiling or upper walls. Given space to store

them, it pays to have a pair of light trestles, a little more than waist-high, and three long boards, a foot wide each, to lay from one trestle to the other. This makes a safe and handy scaffold. In default of it one may make shift with two light barrels, set on end, with a stout ironing-board laid between. By looking before stepping one can use the make-shift scaffold with no risk at all. Whiten a ceiling in strips the long way of the room, moving the brush up and down in straight strokes, and taking care not to leave a rough place where the new stroke joins the one previously made. This is relatively easy with a scaffold, but almost impossible upon the confined footing of a step-ladder.

Painting Walls and Floors

With a can of good ready-mixed paint, painting walls and floors is no job at all. Paper-hanging is a little harder, but by no means beyond the strength or skill of an average woman. Putting up textile hangings, as burlaps, denim, cretonne, requires only a little knowledge, and something of knack. But, first, the walls themselves must be made sound and trig. Except for a painted wall, plaster is a better stop-gap than putty. Paper does not stick well to putty, and the oil in it comes through any sort of cloth. Sift plaster a pint at a time into a clean bowl, mix it with cold water to a very soft dough; fill all the broken spots in the wall with this dough, and smooth each as filled with either a small trowel or a broad-bladed knife dipped in cold water between strokes to keep it from sticking. Work quickly, so the plaster may not set until it is in place. By mixing it thus in small quantity it can be used up clean. With big breaks it is best to mix fine sand and quick-lime in equal quantity, through the plaster, wet with hot water, apply to the wall in handfuls, and smooth before it sets by laying

on a bit of board, and hammering the board lightly until the mortar is flat with the rest of the wall. Before painting the mended spot let it dry a day or two, then brush it well over with strong vinegar, to neutralise the quicklime and save the paint from discolouration.

Always cover a floor with paper, old cloths, boards, even straw, before beginning to work at painting or whitewashing. It is a trouble that saves very much worse trouble. In using paint ready mixed, always shake the can well before pouring out any. The colour settles by standing. Unless it is thus shaken up the bottom of a can will be three to four shades darker than the top. Thin paint, too thick to spread well, with turpentine and linseed oil. Boiled oil is best—two-thirds oil to one-third turpentine is a fairly good proportion for indoor work. Stir the paint-bucket hard before putting a brush in it, and try a stroke or two on a board to make sure it is right for the wall. A blotch in the beginning is a hard thing to paint out; besides, it confuses the eye. Upon new walls the priming coat should be very thin, barely enough paint to colour the oil. If it needs to dry quickly put in a good deal of turpentine, and leave doors and windows open day and night. Apply the second coat of full thickness, and do not try to dry it out with turpentine. Time alone gives paint a dependable surface. In repainting, wash the wall well with soda and pearl-ash, and let it get thoroughly dry. Otherwise the grime and grease will streak the new paint, or, if very thick, show through it and make it flake.

A regular coat of paint, especially one grained and varnished, can only be burned off; hence, no amateur ought to undertake it. But stained and varnished wood, or even varnished paint, much defaced, can be recoloured unprofessionally, though it is troublesome work. The surface must first be washed in turpentine to soften the varnish; then, after an hour, in alcohol, to remove the

bulk of it. Then comes a washing in strong pearl-ash, rinsing, drying, and sandpapering. All this will leave a surface mottled and not coloured, but readily receptive. Notwithstanding, it is hardly safe to try making it a new colour more delicate than the old.

Reliable Stains for Wood

Prepared stains are cheap and convenient; the trouble with them is they are seldom mixed in oil. Thus the colour is washy, and fades, instead of deepening with age. Hence it seems worth while to give the following receipts for stains, all of which may be used on any wood, unpainted, or brought to a taking surface, but all of which likewise give the best results upon pine and white wood clear of knots.

Cherry Stain: Half-gallon raw linseed-oil, half-gallon spirits turpentine, mix well with one ounce Indian red, try a little on the wood to be stained, and if too pale put in more colour. Keep trying until the right tone is found; some wood takes colour much easier than other sorts. The stain must be a true stain, thin enough to let the natural wood-grain show through. Give one or two coats according to the depth required, and finish by rubbing lightly with sandpaper, then giving a single coat of colourless shellac varnish.

Mahogany Stain: Mix as for cherry stain, using a little less Indian red, and adding as much burnt sienna. Put in both colours sparingly, trying the stain between times, until sure of the shade wanted. The more sienna, the duller and softer will be the tone. If too deep, add more turpentine and oil. Fresh wood will take up from half to two-thirds more stain than that which has been painted or oiled. With very porous wood, or where the grain is rough, it is worth while to use a filler, and rub down with sandpaper before applying the stain.

Oak and Walnut Stain: Raw umber mixed with the oil and turpentine gives oak colour; burnt umber, walnut. Antique oak-finish comes from rubbing over with a mixture of one part raw linseed-oil, two parts turpentine, a little burnt sienna, and just enough lamp-black to colour well. This is best put on with a sponge or woollen rag, and rubbed in and off, as applied. It must be thin enough not to show black except in the grain-lines—the hard ridges ought not to take it up. Since it is very hard to achieve this result on soft wood, antique oak is not commendable save for genuine oak-wood.

Filler for White Woods: Mix through half a gallon of the oil and turpentine, half a pint of sifted cornstarch, and half a pint of sifted whiting. Stir well, and apply all over the wood. Let it dry before putting on the stain. For dark wood mix well through the filler a tablespoonful of burnt umber or burnt sienna. Wood or anything to be treated with stain or filler must first be made absolutely clean.

Restoring Wood, Wicker, Etc.

If wicker furniture has been varnished it will not take enamel without removing the varnish. Pour boiling water, with a little washing-soda in it, over and through the wicker-work for at least ten minutes; let it dry, go over it with a flannel wet in either turpentine or naphtha. Leave in the air, and next day rub down with sandpaper. Wicker, rush, and bamboo things are better dyed than painted. A good black dye is made by dissolving half a pound of logwood extract in three gallons of water, and, after it boils well, adding four ounces of blue vitriol dissolved in a quart of water. Boil ten minutes longer, skim well, and apply boiling hot with a very thick soft brush. If possible, hold the thing to be stained over the boiling dye-pot while the staining goes on. If the first

coat is not deep enough, boil down the dye one half, and give a second coat. Let dry two days, then scrub well with a stiff brush and strong tepid soap-suds. This ought to prevent smut. After drying, the black can be varnished, oiled, or treated with wax, or with furniture-polish.

Unpainted wood or raw wicker can be dyed almost any colour with good domestic dyes. Red is particularly effective. Wet the surface to be dyed with clear hot water before dyeing. The wetting makes it take colour evenly. For white enamel a clean dry surface is requisite. Use pure white lead, the best-boiled linseed-oil, and white varnish. Put just enough lead to colour the oil in the priming coat. Let it dry three days; then at like intervals give three coats of white lead, mixed very smooth, and each a little thicker than the last. The finishing coat should be thicker than rich cream, and put on very smooth. Give two coats of the white varnish, rub down with sandpaper, and finish with oil applied with a silk swab, and rubbed to a high polish. Beware of dust. Unless the work is covered while the coats are drying, it is likely to come out more gray than white.

Sun-faded spots in stained wood, as a floor or window-casing, can be restored thus: Cover the spot with a folded cloth wet in benzine or turpentine, let it lie an hour, then rub over with alcohol, and wash with strong soda-water about blood-warm. This takes off the old varnish. Stain afresh, taking care that the new colour goes out quite to the old; let dry, revarnish, and polish.

How to Make and Use Putty

Fill all shrunken seams in wood, or cracks, or crannies, or crevices with putty before beginning to paint or stain. Old putty, kept over from former repairings, may be softened by beating it gently, and dropping in oil as it is beaten.

Notwithstanding it often pays better to mix it fresh, it is never quite so manageable after reworking. The mixing is very simple. Sift two pounds of whiting into an earthen bowl, make a hole in the middle, and pour in gradually, stirring and pounding all the time, enough raw linseed-oil to make it the proper consistency. This is another point in favour of home-mixing—it can be stiff, or soft, at need.

For deep and wide floor-cracks it ought to be as stiff as biscuit-dough. Do not try to fill a crack that can be seen through without first putting in a sliver of wood thin enough to come half way to the top. Nail the sliver every foot or so with the smallest-size brads, set diagonally first one side, then the other. Then cram the crack full of putty and smooth off the top, but take care in the smoothing not to smear the wood either side, nor to leave the putty higher than the floor. Without the wood at bottom, walking breaks the putty almost as soon as it hardens, and grinds it through, thus leaving the crack's last estate worse than the first. An open crack too narrow to get in a sliver ought to have the fine brads driven in each side and left with the heads standing out, crossing each other a little below the floor-level, before the putty is put in. It will harden all round them, and, even though it may break, stay in place a long time.

With putty much depends on knowing how to handle it. For filling longitudinal spaces—as seams, cracks, split places, shrunken panels—take a ball of putty the size of an egg, and roll it between the palms until it forms a long worm-shape. Make the worm as near as possible the same size all the way, and of a thickness proportionate to the space it must fill. Press it firmly in place; then with a blunt, broad-bladed knife run over it hard, level it, and smooth it, scraping off the surplus.

For filling nail-holes, or knot-holes, make a thickish worm, lay it flat upon a smooth board, and cut it into

bits. Press a bit into each hole, and smooth off with the knife. Be careful, always, not to smear; also to leave the surface level. With very soft putty it may be left a little higher than the wood, as it will shrink a bit in hardening. With many smallish cracks to fill it, it pays to use a putty-tube. Make it of either stout tin-foil, or oiled paper. Double a square to form a cornucopia, fasten it firmly; then half fill with soft putty, snip off the pointed end very slightly, and squeeze the putty through it. If the stream is too small, snip a little more, but beware of getting it too big. With care a tube can be refilled many times. Begin at the end of a seam, and squeeze the putty into it, moving slowly, and keeping the worm even. If the seam is irregular, thicken the worm in the big places by moving the tube more slowly, squeezing a little harder the while.

With window-glass of the proper size, filling a broken pane is a small matter. First break out the old pane's remnants, working the bits from underneath the putty. Then a few taps with the hammer-head will break the putty so it can be easily removed. Scrape the sash-edges clean, and, if possible, take out the sash and lay it flat, putty side upward. Fit in the new pane, and drive a very small tack in the middle of each side, with the head projecting so as to hold the glass firm. Then put in glaziers' points all round—that is small, sharp triangles of tin—with the points pressed into the sash, and the sides flat against the glass. Lacking the points, put in two more tacks on each of the four sides. Drive them in far enough for the putty to cover the heads. Lay a roll of putty along one side, smooth and shape it with the knife, and be sure to leave it no wider than the shoulder of the sash; also not to blur the glass. Finish one side before touching putty to another. The second day after putting in, paint the putty well with white lead, rather thinly mixed in oil. Putty is at first wholly im-

pervious to water, but, left unpainted, weathers in a few months, and begins crumbling away.

In closets and pantries it is a very present help against the inroads of crawling things. Wherefore it is well worth while to cram and crowd every crevice with it. Then, if the putty itself cracks, put in more. It sticketh closer than a friend or brother, and is more subtle than even a cockroach or a water-bug. In the bath-room it works wonders, and is safe to use as it does not absorb moisture, neither odours, save in a very slight degree.

Paperhanging

Paper will not stick either to a painted wall or to one finished white or whitewashed. Or, rather, it will not stick serviceably unless the wall is properly prepared. Painted walls must be washed clean and well sized.

Whitewashed walls need to be dry-scrubbed with a very stiff brush, then washed in very strong alum-water, or else strong vinegar, and after drying three days, to get a vigorous sand-swabbing. The sand-swab is a pint of sand tied up in stout double burlaps. If the swabbing leaves the surface still lime-dusty, go over the wall again with vinegar or alum-water almost boiling hot. Apply it with a thick paint-brush, and be sure no space escapes wetting. Unless the lime is thus neutralised with acid it will make the paper crack, and pop off the wall. Hard white finish is nearly as bad as whitewash. It is unsafe to paper either, even after washing and scraping, without first putting on one or two coats of size. Make the wall-size of wheat-bran or glue, as directed for whitewash. If of glue, thin it one half with vinegar, and put on boiling hot.

It saves much work to have wall-paper trimmed in the shop where it is bought. Dealers commonly do it without charge. Have the left-hand selvage cut. With a

figured paper, begin either at the top of the wall or the picture-moulding, and measure to the base-board, but, before cutting a length, look at the figure. If by cutting an exact length the pattern comes off so as to match the upper end, well and good. If it does not so match, raise the first length until the bottom line cuts a pattern-figure exactly in half. Thus, by wasting six inches in the beginning, it is possible to save a roll or two if the room is large. Cut a dozen or twenty lengths matching the figure accurately to the first, and taking great care that the pattern shall run straight across the wall. Nothing looks much worse than a papered wall with the design running askew, six inches higher at one end of it than the other, although the ascent may be so slight every figure appears to match.

The safeguard against that, after accurate cutting, is to start square. Corners are rarely true, and door and window-casing are often out of plumb, especially in old houses, or new ones still settling. Before beginning to hang the paper, strike a plumb-line with chalk from top to bottom. That is to say—hang a compact weight by a cord, dipped in powdered chalk, flat against the wall, with the upper end of the cord at the ceiling and the weight resting against the base-board. Hold both ends fast, then draw the taut cord out smartly, and let it strike the wall. It will leave a mark entirely true. Set the first length by this mark; then, if the ends are level, the figure must run right.

Lay the cut lengths one on another, wrong side up, upon a scaffold a little wider than themselves—here again the boards and trestles come in excellently. Cover the top length with paste throughout, then fold it back upon itself, accurately in half, lay it off, paste and double the next. Do not paste more than half a dozen at once—the paste dries; besides, the paper gets tender. Set a step-ladder in front of the plumb-line, and stand on it to

put on the paper. Take a folded length, with the upper end between the thumbs and fingers of each hand, having first separated the ends for perhaps six inches. Apply the upper end firmly to the wall, keeping the trimmed edge true with the mark. Spread it smooth, then deftly unfold the length all the way down, press the upper half of it firmly in place, then step down and affix the lower half. Now with a soft cloth in each hand go over the whole length, pressing outward from the middle to the sides, so as to remove all blisters. If an obstinate one remains near the middle, prick it with a coarse needle, and pack the wet paper down hard all round the puncture. Be specially careful not to smooth blisters into wrinkles. Wrinkles look ill in themselves, but do worse harm by drawing edges out of plumb.

With a frieze and dado, the paper lengths are handily short. Cut the frieze in lengths of about four feet, make them very pasty, and be sure to match the figure perfectly, if figure there is. If the cove adjoining the ceiling is to have a separate paper, cut it exactly the right depth before paste touches it. At notched door or window-casings let the wet paper lap far enough to break out the projections. It may seem a waste of paper, but paper is cheap in comparison with strength and trouble.

Papering a ceiling is not a nice job even when the ceiling is low. Still, it can be done if one is willing to take pains. Cut the lengths to fit, also to run the shortest way of the room; do not fold them after pasting, but raise them single upon the hands, stick them first near the middle, and work them on toward the ends. If the frieze-paper meets the ceiling, put on the ceiling first, and let the ends lap down upon the wall far enough for the frieze-lengths to take hold on them.

It is never safe to paper a ceiling over an old paper. The two will crack, curl, and sag after a little while. Indeed, it pays to take off old paper even from walls, al-

though it is a tedious job, withal troublesome. If the room is to be repainted, and can be emptied of everything, a good way is to spray the walls and ceiling freely with hot water from a garden atomiser, then close windows and doors tight, and set an open vessel of water over a lighted oil-stove in the middle of the floor. After several hours the steam will have so softened and loosened the paper, it will come off in big sheets. But where the steaming is out of the question, one must rely upon sprinkling with the atomiser, and scraping. A light, sharp steel garden-hoe is about the best scraper. In scraping a ceiling it is well to wear big glasses, as a fleck of the wet paper, striking full in the eye, may prove a serious matter.

Paper Paste

Paste is best made fresh every day or two. Put on a gallon of water in a two-gallon open kettle, add a heaping tablespoonful of salt, and set it to boil. Mix two heaping teaspoonfuls of flour gradually, with enough cold water to make it a little thicker than cream. When the water boils, pour in the flour, stirring hard all the time so there shall be no lumps. Drop in a lump of tallow as big as a walnut, cook for five minutes, then add an ounce of alum dissolved in a cup of boiling water. Properly made, this needs no straining. If there are lumps, strain it before using. Apply to the paper with a flat broad brush, soft and thick. If the paste must be kept over a day or two in hot weather, a few drops of oil of cloves will keep it from souring.

To Clean Papered Walls

A mop of cheese-cloth strips, an inch and a half wide and eight inches long, made fast to a light handle is the best thing for keeping a papered wall clean. Brush the

paper well with it twice a month. Every spring and fall mix cornstarch, whiting, and powdered Fuller's earth in equal parts, dip the mop into the powder, and rub walls and ceiling well with it. Then shake all powder from the mop, cover it with a damp flannel, and go all over the wall again, wiping in long straight strokes. The flannel must be only damp. Wet, it is apt to leave marks. As soon as it is dirty, change it for a fresh one.

Thick crust-slices from a very stale loaf will also clean wall-paper. Begin at the top and rub downward with long, steady strokes. It is a good way to cut a square loaf in two, lengthwise, rub with it till the cut surface is soiled, then slice the dirt off. Fuller's earth mixed to a thin paste with ammonia, and let dry over grease-spots, will usually remove them. Brush off the dry paste with a clean stiff brush. For very delicate paper, fold powdered French chalk flat inside a thickness of gauze, lay the chalk-pad against the grease-spot, and press well with a blazing-hot iron. Properly managed, there will be no mark left. But where there is a big spot, the best way is to cut the paper square around it, wet, and scrape off; then put on a new piece, matching the wall-pattern accurately. There should be an extra roll saved over from every room for just such work.

Spots in Wood and Metal

Faded spots in hard wood, from heat, light or the touch of too strong alkalies, can be brought back to their original colour by repeated gentle rubbings with boiled linseed-oil, mixed with one-eighth of alcohol. Rub two or three times each day, using a clean silk or linen swab each time. Old linen and flannel ought to be kept for such uses, as well as old silk, which also makes the best of all polishing cloths. Make swabs by rolling fine cotton-batting into tight small balls, and tying a ball in a square

of cloth. The loose cloth-ends form a handle. Throw away swabs as soon as they get hard or dirty.

For polishing marble, stone, and metal dry, use a lead swab. To make it, cut a circle of stout unbleached muslin eight inches across, and gather it around the edges with strong thread. Pour into it a pound of the heaviest duck-shot, draw, and sew the gathers firmly. Tie the shot-bag inside a leather square to rub with it. The leather can be used on both sides before it will need washing. The shot-bag lasts indefinitely.

Dents, spots, and scratches upon cabinet wood torment the housewifely conscience. To remove a dent, cover it with four thicknesses of wet paper, and set a blazing hot-iron on the paper for a minute. The steam will raise the compressed wood-layers, though it may play hob with the varnish. Repeat the steaming until there is an even surface. Then sandpaper the place, rub off well with alcohol or naphtha, and revarnish. For a rubbed place, sandpaper it smooth, then swab lightly with paraffin oil, and afterward with a little dry colour, the same as recommended to make that particular wood-stain. Put on the merest suspicion of the colour at first, use a clean swab, and repeat the oil-rubbing in between until the right shade is produced. Finish with a coat of shellac varnish, very lightly rubbed until dry.

A scratch that goes no deeper than the varnish may be helped always, and healed sometimes by holding a red-hot poker an inch above it for the space of half a minute, and rubbing well, as soon as it cools, with a mixture of alcohol, olive-oil, and pure cider-vinegar in equal quantities. This makes a cheap and most excellent furniture-polish. It must be shaken well before using, rubbed in with a woollen cloth, and polished with another. Persistent rubbing with it will efface the white marks left by hot things or wet things upon varnished wood. Where the mixture is used as a polish pure and simple, the thing

to be polished should first be well cleaned either with turpentine, naphtha, or warm soap-suds. Wood scratched deeper than the varnish should not be washed with the suds, as the water soaks into the scratches and makes an ugly permanent stain.

Mahogany, especially old mahogany, has a trick of getting filmy no matter how well cared for. To remove the film, wash it every three months with weak tepid suds, then polish with this polish, which is French, and warranted to give fine wood an incomparable lustre.

French Polish for Hard Woods: Ten parts pale rosin, eighty parts benzine, five parts palm-oil, one-half part essence verbena, one-and-one-half parts essence peppermint. Keep hermetically sealed away from fire and light. Shake well before using. Apply with a silk rag, and polish after with a dry silk cloth.

The Care of Mirrors

Remove fly-specks and dirt from mirror surfaces with whiting mixed to a cream in alcohol. To clean a gilt mirror-frame, brush off every particle of loose dust, then wet it a little space at a time with alcohol applied with a camel's-hair brush. Rub off the alcohol before it dries with clean, soft silk cloths or fine flannel. The dirt should come with it—hence change the cloth often. If there are breaks or rubbed places in an ornamental frame, fill up with plaster, wet very soft with white of egg, shape quickly, let set, then smooth over with plaster newly wet to a cream in tepid water. When the outer coat is full dry, gild either by pressing on gold-leaf or painting with gold paint. Only the finest frames are worth genuine gold-leaf. The same treatment, of course, applies to picture-frames. Pictures themselves are best cleaned by a very quick wiping over with a cloth wet in alcohol, and afterward another quick wash with weak white soap-suds.

They must be patted, not rubbed dry, with very soft towels. Nothing powerful enough, either chemically or mechanically, to attack varnish and colours ought ever to touch a canvas.

If a mirror is badly blurred, resilvering is the only genuine cure. Partial blurring may be mitigated in several ways, and scratches made almost invisible. Take out the wooden back, wipe off the silvered side quickly and carefully with a cloth wrung out of warm water. Be sure to wring it dry, and follow it with a patting from a soft hot towel.

If there are scratches, paint them over with the very best silver paint, cover, and leave to dry. Or the scratch may be backed with a square of silver, or tin-foil, with a drop of white glue at each corner to hold it in place. With blurs, mark them out so as to give a clean outline, wet the blurred silver with alcohol, and after a little scrape it off. Then either paint the clear spot or back it with foil. The foil must be something bigger—big enough to be glued to sound silvering, as the glue will show through the glass. Lacking both paint and foil, a mirror may be bettered by simply laying gray-dark cloth behind the defects. If it hangs away from the light, black cloth is better than gray.

Repairing Upholstery

Upholstery demands more knack than strength. In recovering anything, as a chair or sofa, first remove the tacks which hold the edging-gimp, then take off the plain outsides. This will reveal the tacking. Cut the tacking threads, remove the buttons, noting how they are applied. Loose all the edge tacks, take off the old cover, mark the middle of it, brush it well, and press very smooth. Go over the chair with a whisk-broom and a small brush, and remove every particle of dust and lint from the tufting.

Spread out the new covering flat and smooth, doubling it lengthwise, right sides together. Fold the old cover likewise, and lay it on as a pattern, taking care to make the threads run the same in old and new. Cut with very sharp shears, and sew up wherever seams are needed. Follow the original cover in finishing. That is to say, either bind the bottom and leave it free, or sew it to the seat-cover and bind the seam. Next, put the middle of the new cover to the marked middle of the frame, tack it lightly with temporary tacks along sides and arms; then begin tufting straight down the middle, taking great pains not to pull the new cover awry.

The tufting requires upholsterers' needles and twine, to be had at any shop. Thread a needle with three yards of twine, double, and knot it; then stick it from the back through the highest middle tuft, press the cover in with the fingers, arranging it in proper folds, pass the needle back, draw it tight, then bring it out again, thread a button upon it, and again pass it to the back. Fasten there with a slip stitch, and go on to the next tuft. Work straight up and down, taking care not to draw the new cover so it will not reach. When the tufting is finished, lay the edge in proper pleats, tack down, and cover with new gimp. Finish the back first with a cover of paper muslin, and over that a smooth stretch of the furniture stuff. It is wise to practise upon something one can afford to spoil, as upholstery is among the rare things easier done than said.

Cleaning Pillows, Mattresses, and Feather-Beds

To clean pillows, whether of down or feathers, empty the stuffing into a bag of cheese-cloth or mosquito-netting, tie the mouth of it tight, and wash in a big tub of strong white soap-suds, touched up with ammonia. Rub

the bag between the hands, and souse up and down for ten minutes. Rinse in clear hot water twice; do not squeeze, but hang to drain and dry—in the sun, or near the heat. When half dry pull the bag apart several times. When full dry, drop it inside a thicker bag, and whip vigorously with a rattan whip for ten minutes. The feathers will be like new. There is a slight loss, of course. Half a dozen pillows will come through the wash about five. Because of the loss, do not wash either feathers or hair in set tubs—the fluff going into the pipes makes no end of trouble.

Feather-beds or hair-mattresses can be washed the same way. Either is an undertaking, but one worth while. Pick up the hair from the mattress before it is wet. Let it dry thoroughly before making up anew. To do that cut a mattress-tick, sew the bottom and both sides well together, bind the seams, and sew on a cover across the top. Spread a sheet on the floor, stretch the new tick upon it, and set a chair at each corner, to which the sides may be attached. Thus they stay upright, while the hair goes in. Pack it evenly all over, then draw down the cover, and pin it smoothly to the sides and across the bottom. Begin at one side and tack, using a mattress needle and soft but strong twine—rough twine cuts and pulls. Go up and down twice, and finish by tying. Mattress buttons are ornamental, but a round of thick flannel answers every purpose.

Feathers in a clean tick freshen wonderfully for getting wet with summer rain, and then sunning a week. It is much better than the steam-scouring, though the scouring is better than no cleaning. Down comforts may be wet with clean water, and hung in the hot sun with manifest betterment. Cotton out of comforts may be washed like feathers, only it needs no bag. When dry, pick or card it afresh, or sun well, and whip hard.

The Soldering-Iron

Leaks, unless they happen to be in the water-back itself, may be held in check with the soldering-iron until the plumber comes. If small, they may be mended outright. They have so much a habit of developing at the most inconvenient times, it is wise to practise with the iron until reasonably expert. For a hot-water leak, draw the fire, cut off the water, and empty the boiler by opening the lower plug. Hammer the leak gently so as to press the rent edges together. Make a little dam round about it with wet flour or plaster, sprinkle in powdered rosin, hold the stick of solder hard against the break, and apply the white-hot iron until the solder runs. As soon as the solder cools, turn on the water and test the mend.

As to Drawers

A drawer that works hard—either binds in some place or is not built true. For the binding, the plane is the remedy. Take off two or three good shavings wherever there is sign of friction. To test the build, press across the back-corners diagonally—if they give, square them, and put in screws to keep them so. Closet-drawers built in a house or apartment are nearly sure to need the screws. Steam-heat plays hob to such an extent with glue, unseasoned wood, and poor carpentry, it is always well in reconstructions to strengthen everything with screws or brads.

Mending Furniture

Though liquid glue is so cheap, a glue-pot pays. Melt only as much as required—remelting takes away strength. Break the dry glue into the pot, cover it with cold water, half fill the water-bath around it, and add salt to raise

the boiling-point of the bath. Boil until the glue is clear and ropy. Thin for use with strong vinegar or alcohol. For fine work melt white glue in china—say a cup set in a saucepan—and thin after melting with twice its own bulk of gin.

To mend wood well, scrape away every trace of the old glue, and wash the join clean. Wipe it dry. Cover both pieces well with the hot glue, press them firmly together, and tie fast. But do not depend wholly on the glue. Turn the mended article upside down, and drive short brads diagonally from both sides. They must be short enough not to reach the surface. Sometimes a screw is better than brads. First make a fine gimlet-hole, so deep the screw-head can be countersunk. Put in the screw, force it in a quarter-inch under the surface, fill the hole with putty, and stain or varnish. But that comes after the drying. Leave the glue a week in a moderate temperature to harden, then scrape off the surplus glue, sandpaper the join, and polish with oil and alcohol.

Chapter *THREE*

Concerning Closets

THE ideal closet is like the dictionary, the place where a thing can be looked for with the certainty of finding it. To make and keep it so requires both knowledge and wisdom. The knowledge alone can be put into print. Wisdom, like so many other good things, comes by nature. That is but a brief way of saying that housewives, like poets, must be born, and get a deal of making afterward. Notwithstanding, much *may* be *done* in the face of natural lacks. The bumps of order and contrivance are wonderfully susceptible to proper stimulation.

Kitchen-Closets

Their construction has been sufficiently dealt with. (See Chapter Kitchen Convenience.) As to their use and keeping much remains to be said. The saying is in large measure a succession of Don'ts. For example: Don't put pots and pans behind closet-doors until they are thoroughly and scrupulously clean. If cleaning them must wait for a more convenient season, leave them in the open—upon the hearth, in the sink, or on the kitchen-table. Turning a greasy or sticky vessel upside down upon a closet-shelf is offering a premium for ancient and fish-like smells. Indeed shelves upon which even clean vessels are to be kept inverted ought to be full of auger-holes—full enough to prevent even a suspicion of musty

air. But make all other orifices, as cracks at the back, or where the wall joins, or around the corner posts, water-tight, and water-bug-tight, with putty plentifully laid on, or with plaster and white of egg. Putty is best because it can be washed with impunity. For the same reason painting with pure white-lead is the very best interior closet finish. White-lead is, however, expensive. Its place can be well taken by the quick-lime whitewash. (See Chapter on Repairs.) The whitewash will bear quick and careful washing. Moreover, it can be renewed quarterly at a slight expense in money and trouble. Paint or whitewash walls, joints, the under sides of shelves—everything except the shelf-surfaces. Leave them untouched. Don't cover them. Wash them weekly with soda-water and a little soap, and monthly, scour well.

Strips of wood screwed to the closet-back and filled with nails and screw-hooks for hanging up things hangible nearly double closet space. Fit the strips so neatly no creeper can harbour behind them. If they warp, fill the warpings with putty. Ironmongery is nearly always heavy, hence best kept to itself on a low, handy shelf. It is a mistake to put it too low—stooping is tiresome enough without lifting a weight in rising.

Don't put away cooked food in a kitchen-closet. It will taint the air, and itself in turn be tainted, though ever so faintly. Smells have for long been held to come from faint volatile particles, escaping from odorous substances and diffused in the air. The newest smell-explanation is that, like light, smells come through the perception of special vibrations. The persistence of food-odours certainly lends a colour of reason to the new theory. It is this persistence which makes various economies unthrifty. For example, by saving a cent's worth of left-over turnips, cabbage, or such matter, one may develop at least $5.00 worth of bad smell in a closet.

Closets located above set-tubs ought to be set apart for earthenware. The rising steam will rust and corrode iron, tin, copper, and brass. If general use of a closet so placed is imperative, upon wash-day mornings put a lump of quicklime, as big as the two fists, in a platter upon every shelf, and close the doors tight. The thirsty lime will drink up the moisture and keep the closet dry and sweet. The same precaution is wise in muggy weather, especially if it is hot as well. Indeed, throughout the dog-days a cheese-cloth bag of quicklime suspended in every kitchen-closet will do much to make the kitchen-atmosphere entirely wholesome.

In closet-scouring a flood of water is by no means essential. Take out everything, then, beginning at the top, with a soft, dry cloth, wipe away every trace of dust and all loose particles. Rub all the grease-spots well with either a good scouring soap or a jelly made by dissolving laundry soap in a little water and adding a cupful of very strong soda-water. This jelly ought to be kept on hand in a low, wide-mouthed glass jar. Use squares of coarse crash, or even burlaps, for scouring cloths—closely woven stuffs do not take up dirt half so well. Wring a cloth out of very hot water, and go over the whole shelf. Leave it wet, but not sloppy, when a soaped spot has to be dealt with. Wash the soaped spots last, then with clean, hot water go again over all the shelf-surface, rubbing hard, and leaving it as dry as possible. The whitened walls should be wiped over with the cloth wrung out of soap-suds. Zinc-paints are bad in closets, because they bear scouring so ill. White-lead with reasonable care ought to last ten years.

Don't set sticky dishes or bowls or platters upon a closet-shelf. That is one way to draw all the host of crawl-y things which so infest slovenly kitchens. Apartment kitchens often suffer such visitations in spite of the utmost vigilance in their keepers. Roaches and water-

bugs are rank expansionists, and delight from the vantage-ground of one ill-kept kitchen to overrun and possess half a dozen clean ones. Putty well applied does much to foil them. If any slip past the blockade kill them with powdered borax. Mix it with its own bulk of powdered sugar, and strew it liberally wherever the insects congregate. Benzine is also useful in such warfare. Use it only in summer and when it is broad daylight. Open all the windows wide, put the benzine in something with a long slender spout, and go over, under, through, above, below, between, beneath, everything that can hide a bug. Keep the liquid running a fine steady stream—thus only will no guilty crawler escape. Close doors but leave windows wide, and let the room stand untouched for twelve hours, or twenty-four if possible. Beware of striking a match or carrying a light in it until the benzine fumes have been dissipated.

Pantries and Store-Rooms

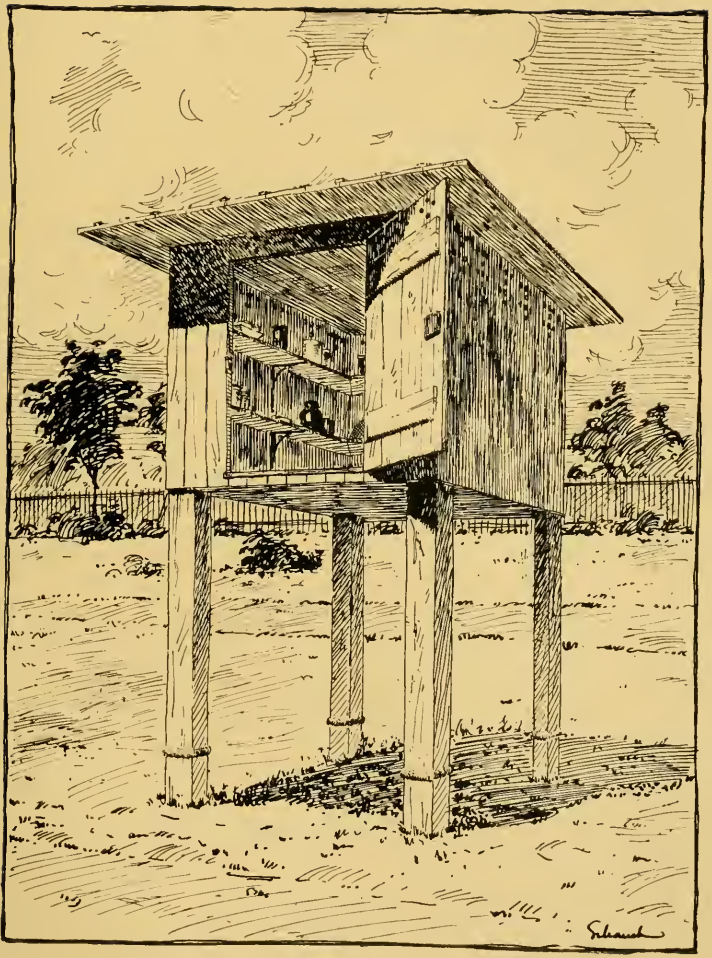
Pantry requirements are a trifle paradoxical, in that they are air and light, and also air and darkness. A pantry window is essential, even if it be no more than a tiny two-light sliding sash set anyhow in the outer wall. A regular window is much better. It need not waste wall-space—shelves can be so placed across it as to admit its working. But if a pantry can be allotted as much as six feet of house-wall, it is better to have the window set cross-wise, with the lower edge a little more than breast-high. Then, by making one sash of glass, and filling the other with wire-gauze, the pantry can have a fresh-air closet. Have a tight deal partition running out from the sash division as far as space permits. Put shelves around three sides of the two compartments thus formed, and close them with tight light deal doors. Thus the pantry can subserve its proper purposes, and the fresh-air closet

banish the iceman for six months in the year. Throughout the other six it is no less useful. All manner of food keeps beautifully in it, from one meal to the next. Further, things may be put in it while still warm. If they have to go into a tight, unventilated place as a refrigerator, they needs must be stone-cold, or they will get soggy and smelly.

Always set away cooked things in dishes with ventilated covers. Wire-gauze dish-covers are excellent, but too costly for many purses. A good substitute is a hoop or oval of stout wire, with either cheese-cloth or mosquito-net sewed firmly over it. Make the hoops of sizes to fit all sorts of dishes, or, rather, of sizes to stand an inch beyond the edges they must cover. The weight of the wire holds them well down. Every week drop the covers in a wash-boiler with water and a little soda, boil for five minutes, and dry in the sun.

Light and lime, the best of all antiseptics, should be relied on to keep the fresh-air closet sweet. Hang a bag of quicklime somewhere, and change the contents as fast as the lime slacks. In country or suburban houses ants are often a plague. A ring of air-slacked lime, an inch wide and half an inch deep, will keep them out of a dish holding food. They cannot crawl over a shelf thickly dusted with powdered lime. But, since they travel always by definite roads, it is well to find the path, and block it by a smear of coal or pine-tar, applied, if possible, outside the pantry.

Save in freezing weather, keep fruits, vegetables, and cut flowers in the fresh-air closet until wanted. Cooked meats and salt ones can stay there the year round, and fresh meats in cold weather. It is, further, the place for such things as cheese, nuts, raisins, dates, and olives. All of these lose flavour or grow rank by keeping in a warm place, or by suffering great alternations of temperature.



People with plenty of ground-space, yet constricted houses, may profitably take a leaf from the book of South-country household economy. It is common there for country-folk to have a sort of outdoor fresh-air closet, a small detached structure set in the shadiest place possible, standing upon four tall legs, with a flat shingle-roof of barely enough pitch to shed rain. The floor is at least four feet from the ground, and the whole structure only big enough to reach well across. There are shelves all round, and the weather-boarding up next the roof is full of tiny auger-holes. The door fits tight, and fastens with a lock. Around each of the four legs there is commonly a tar-bandage applied six inches above the ground. This traps venturesome ants, spiders, and the like, thus keeping the inside clear. The structure is whitewashed inside and out twice a year. In hot weather floor and shelves are washed every morning, and scoured twice a week. Such a fixture should not cost over three dollars even if one hires it built; and it is certainly among the handiest things one can have about the house or yard.

How and When to Keep Things

Preserves, jellies, pickles, catsups, etc., keep best on the floor. Set them in orderly rows beneath the lowest shelf. The cool, equable temperature there is just right for them. In front of them hang a thick curtain. Standing in the light makes them insipid and pulpy. Contrariwise, all manner of things put up in sugar are improved in colour and flavour by sunning for several days just after they go in glass. Jelly that will not " jell " is sometimes reformed by sunlight into beautiful solidity. Sunned preserves, especially if there is a brandy paper on top of them, almost never mould, no matter how long they may be kept. Any sort of pickles or preserves will run out in spite of hermetic sealing if the cans are set

where it is alternately very hot and very cold. Tins ought to be impervious to light. Possibly they are, but there must be a sort of X-ray in common daylight, since tin cans suffer almost as much from standing in the light as do glass jars.

Wine in bottles should also be kept on low pantry-shelves. A cellar is better, but often out of the question. Provide either wire bottle-racks, or else have holes cut in the shelving so the bottles can be laid on the side, with the corks a little lower than the tipped hollow ends. Once a month raise each bottle, cork downward, and shake it very gently. Thus any sediment is detached from the side, and gathers in the neck. In drawing a cork, hold the bottle sidewise. By pouring out possibly a table-spoonful of wine before decanting, the whole bottle is freed of dregs.

Vinegar likewise needs to be kept from light after it comes to full strength. While still fermenting, light is a help. It is unsafe to keep either wine, spirits, or vinegar in wood within a pantry. No amount of paint will wholly stop the ravages of the wood-worm, and, once a stave is bored through, the pantry may be flooded in a night. Wickered demijohns of handy size are best for all such liquids. Stone jugs come next. In a pantry that cannot be heated, stoneware is better than glass for vinegar and light wine. Both freeze in zero weather, and stone does not break so easily as glass.

Nothing in brine, neither animal nor vegetable, ought to be kept in a pantry. Better set a pork or beef or pickle barrel wholly outside than risk tainting all the other things one must eat. If hams and smoked beef are hung in it, they ought to be canvassed, then dipped in thick paste, and rolled in flour mixed with ground black pepper before putting up. This keeps away insects, and prevents smells. Put smoked sausage in the stoutest paper-bags, and seal the mouths before tying up. Salt

fish either wet or dry will smell aloud in spite of all precautions. It almost demands to be kept wholly apart.

Whiten and keep white the whole pantry interior. Then moth, rust, mould, also any sort of creeping thing, is plain to a casual glance. As to cleaning, prevention is better than cure. Do not splash or strew things about, nor push them helter-skelter awry, no matter what the haste. A weekly dusting, a monthly sweeping, ought to keep the place clean if they are supplemented with thorough cleanings twice each year. Spring and fall move out everything, look the floor over for cracks, mice-runs, and rat-holes; stop them if found, go over shelving and hooks, make everything tight and trig, then rewhiten—the quicklime whitewash is here the best thing. (See Chapter on Repairs.) Make everything smell fresh and soapy and limey, and let the scoured floor and shelves have a half-day to dry.

Moist sugar, barrelled, is almost sure to drip—hence there is economy in buying granulated or cut loaf. A drippy barrel makes no end of dirt. There are several ways of minimising the trouble. One is to set the barrel upon a low slightly slanted platform, and keep a shallow pan under the drip. Another is to set the barrel in the middle of a big double sheet of the thickest, toughest paper, and tie the paper loosely up around it, about the second hoop. The paper catches the drip, and holds it safe if care is taken not to break it. Otherwise it is better left off.

Storing Clothes, Furs, Blankets, Etc.

Where a store-room can be included in the building plan of a house, put it as near the roof as possible, and, further, skylight it. Thus all the wall-space is free for shelves and hooks. Thus, too, the room gets more sun-

light. Set the shelves along two sides, with the lowest one high enough for a packing-trunk to slip well beneath it. If possible have sliding shelves to draw out from under the stationary ones. They should be in yard-long sections. By their help a shelf-section's contents may be examined, turned over, brushed, and replaced without moving from one spot. Where many heavy trunks are kept, it pays to have staunch hardwood rails on the floor below the shelves. The trunk-castors run on the rails without dragging or hard tugging. Cedar or camphor wood shelves and panels are put into the store-rooms of the finest modern houses. The mass of us, however, must put up with clear pine or deal. Have it painted white, and very well varnished. Dust well spring and fall, then go over the varnish with a woollen cloth wet in kerosene, rubbing lightly and quickly, but leaving no spot untouched. This will make the wood as uninviting to the moth-miller as even sandal-wood. Sachets of cotton-batting, rolled in sandal-wood sawdust and laid between thin silk, may line to advantage the shelves devoted to fine woollens. Such things as Cashmere shawls should be well sunned at least two days, brushed over three times with a thick soft brush, then shaken hard, and folded lengthwise with a layer of clean newspaper between the folds. Next roll them up smoothly into a hard round roll, sew on a tight cover of clean old linen, then slip inside a paper-bag and paste up the mouth. If no moth-eggs are inside at the rolling up, none will be there at the unrolling, though it may be five years later. Neither tobacco, camphor, nor the evil-smelling so-called camphor-tar, will kill hatching moths. The utmost they can do is to warn away the miller-mother.

Camphor alone is dependable for even that service. Get the gum, and break it into little lumps. Sometimes spraying with camphor dissolved in alcohol acts as a preventive. It must be, however, applied only to shelves

or outer coverings, as it dries into white crusty specks disfiguring to fine fabrics.

Sun and brush blankets well. Put little cheese-cloth bags of camphor into the middle of the roll, and sew each pair up tight in old linen. Pack them down in the blanket-chest, which should occupy one side of the store-room. If it is built in the wall, so much the better. There can be broad shallow drawers all along the bottom. Failing that, a movable chest, cedar if possible, should be provided. Even a big wooden drygoods-box is better than no chest. Stop the cracks well with putty, paper the outside, and paint the inside white. Have the lid hinged on, and close with a spring-bolt outside. A strip nailed around the cover, so as to stand half an inch lower than the edge, helps to keep the contents safe. If perfectly sure as to the condition of things packed inside, it pays to seal the edge of the box with a strip of tough paper pasted on, and leave it unbroken until the things are needed.

Quilts and comforts keep best hung over poles. Fasten wooden curtain-poles stoutly so as to stand a foot from the wall. Space permitting, have them of full comfort length. Several may be set between ceiling and floor, the lowest coming a little less than waist-high. Spread quilts and comforts evenly across the poles, one on another, and cover the mass with a sheet of unbleached muslin reaching well below the lowest edges. Reserve the uppermost pole for hangings, especially if there are any of plush or velvet. Sun, whip, and brush them well, baste the edges together, pile in, then baste the doubled edges strongly together, and hang so the seam lies flat along the pole. If other hangings are to occupy it, put the velvet ones on top. Brocade may have much the same treatment. Doubling the right side in prevents fading, and if hung smoothly but lightly full length on the pole, there is no perceptible crease. On top

of all put a muslin cover big enough to shroud everything.

Caring for Rugs and Carpets

Before putting away rugs, spray them with strong black-pepper tea, using a very fine atomiser. Sun well after the spraying, but beat well before it. Beat again, using a strong rattan, brush hard on both sides, then spread smooth, and paste together a sheet of newspapers a little bigger than the rug. Get a round wooden roller two inches through, and as long as the rug is broad. Lay the paper on the right side of the rug, then put the roller at one end and roll up rug and paper, keeping the rolling true throughout. Next roll up spirally in a long strip of soft old cloth, wisp down the ends, and tie fast, then cover with tough manilla paper, paste down the straight edge of it, slip a stout paper-bag over each end of the roll, and paste the bags firmly in place. As long as they are unbroken no moth will get in. This is, of course, only for valuable rugs. Ordinary ones may be beaten, sunned, brushed, sprayed with the pepper tea, and rolled up with a sprinkle of gum-camphor between the folds. Cover the rolls with burlap or manilla paper. If there are already moth-eaten places, and presumably moth-eggs, before rolling up cover the moth-eaten spots with a wet towel and iron with a blazing-hot iron. The steam will make an end of moths, actual or potential.

Carpets, even carpet-lengths, ought to be thoroughly cleaned before going in the store-room. Fold them smoothly and compactly, with a liberal allowance of camphor, and wrap in big muslin sheets. Keep them well toward the middle of the store-room, where light and air are unobstructed. The skylight should be raised every bright day in summer. If sun-fading is feared, fit a light

frame just below the skylight, and tack cheese-cloth over it to temper the rays.

Pack away fine winter garments, silks, cloths, and velvet, in roomy trunks, shallow rather than deep, or with shallow trays. Brush away all dust, untack folds and loopings. With a velvet skirt it pays to take out all the waist-pleats. Fold as smooth as possible, but put a roll of cotton-batting inside tissue-paper at every fold, so there may be no crease. Stuff sleeves likewise full of tissue-paper, crumpled. Lay waists and coats shapely, with crumpled paper inside. Cover the trunk or tray with a soft white cloth before laying in the garment. When the folding is over, draw the white sheet smoothly across every part, and tuck in the ends so as not to crush or crumple. On top of the white spread lay bags of gum-camphor and wisps of cedar-shavings. The trunk may have further the sandal-wood sachets. But in moth-fighting it cannot be too often repeated prevention is the only effectual way.

Particularly with furs. Sun and comb them at least a week, then go over them three times with a stiff thick brush, parting the hair at all creases or folds, and brushing the pelt underneath. Small things, as muffs, tippets, and collars, as well as small capes, can be wrapped in clean newspaper—the ink is a moth-preventive—then wrapped again in old linen, sewed snug, and popped inside a paper-bag; then the bag-mouth pasted, and, after drying, the whole laid in its proper box. Fur garments ought to be hung upon coat-hangers, first sunning and brushing them well. Fasten the fronts, then cover them with several thicknesses of newspaper. Let the paper go lower than the bottom, and double and pin up the surplus length. Next slip a mothaline bag of generous size over the garment, pass the hanger-hook up through the hole in the top of the bag, and tie the bag very tight around the hook-shank. Pin up the extra bag-length all along the

bottom, folding it over at least three times. Hang the bagged garment where nothing else will touch it. Thus it is saved from both creasing and moths.

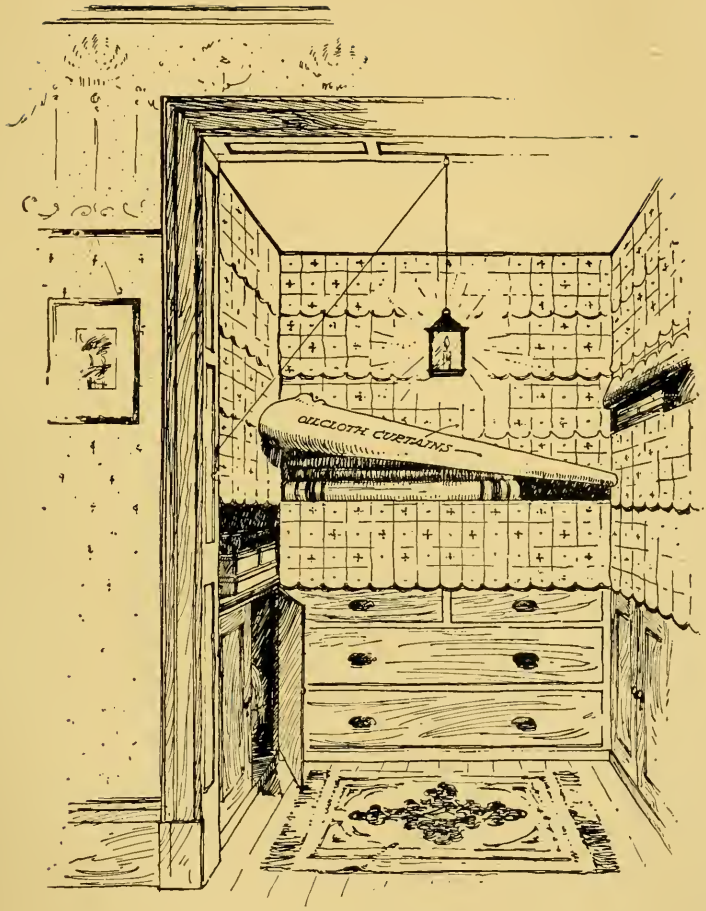
Storing summer things is simple. All that is needed is to have them free of starch, dust, and grime, to fold them neatly, and cover them from the light. Frivolous summer frocks can go in the boxes. Other things are much better laid upon the shelves. Where there are many children it is a good plan to put each little one's garments together upon a shelf, with the name marked plain on top of them. It is the same with summer room-fittings. Put them together, and mark as "The Blue Room," or "The Red Parlor." Denim, which washes badly, may be stored after a good brushing, and be serviceable next season. But chintz, muslin, and net hangings are best put away rough dry.

The Linen-Closet

A word in the beginning. Linen ought to be for use, not for show. Better the simplest cloths fresh from the laundry, even if something frayed, than the richest damask yellow with long lying. Indeed, it ought to be a cardinal rule in every home that the silver, linen, and fine manners are to be used every day. Use brightens and whitens all three, and does not wear them anything like so much as lying in wait for company.

Use, which is thus essential, should be also equal. To insure that, have a drawer apart from the main linen-closet. In it store a two-weeks' supply of every linen requisite. When all its contents have had their turn, take them back to the main closet and bring others in their stead.

Since a linen-closet may be nothing more than a cuddy, or a stately apartment all over shelves and tables, it is worse than idle to dogmatise regarding its arrangement.



THE LINEN-CLOSET

But in a general way one principle runs through great and small. It is orderly and systematic placing. In the linen-room of the world's finest hotel there is a specially marked shelf-space for the linen belonging to each of the seven-hundred-odd rooms. Linen is not a conventional term there. Sheets, pillow-cases, cushion-slips, are of real linen, Irish or German, grass-bleached, hand-sewed, and embroidered with the hotel initial within a wreath of oak-leaves. Further, in the table-linen section each day of the week has a shelf. Monday's cloths and napkins go out only upon Mondays. Tuesdays it is the same. Even in times of great stress the rule keeps intact. The proprietor had rather buy extra things than to set the system of giving out and checking the main supply awry.

This linen-room keeps books with itself. Every room is charged with the things issued to it. The chambermaids and laundrymen are responsible for its safe return. The laundry, which is up in the airy tip-top, beautifully lighted and ventilated, can wash, iron, and return five-thousand-odd pieces within an hour, and that without strain. Steam, steel, and electricity do the work, plentifully supplemented by human skill and muscle. The big steam mangle-rollers are ten feet long and four feet across. Six girls stand either side of them, to spread the damp linen in place and take it off as it comes up smooth, dry, and shining.

No housewife, even the richest, can command all that. It has been mentioned merely by way of exemplifying the value of system. What the hotel does in large the housemother may do in little, by dividing her shelves and marking the spaces appropriately, as: "Huck Towels," "Hemstitched Towels," "Damask Towels for Blue Chamber," "Towels and Sheets for Back Room," or "Nursery Sheets and Towels." Tie each week's wear with a separate-coloured ribbon, and beside the marking put matching ribbons, numbered one, two, three, four.

With the blue ribbon empty, there cannot be a question as to which colour's turn is next.

With a sufficient towel supply, divide the towel-shelf and mark the divisions with the days of the week. Thus use can be regular. To insure that with napkins, always take out fresh ones from the bottom of the pile, or else put the clean ones underneath as they come from the wash. Keep shelves and drawers as nearly as possible free from dust. A good way to do it is to curtain them with thin white oil-cloth, daintily scalloped along the bottom, and deep enough to reach from shelf to shelf. Tack the upper part to the shelf-edge, and along the bottom sew stout hooks, eight or ten inches apart. Opposite every hook, in the shelf above and below, put in a tiny brass screw-eye. Hook down the curtains after the shelves are filled, and hook them up out of the way in taking down or putting up linen.

To light a closet of any kind, but more especially a linen-closet, the safest thing next after electricity is a light clear glass lantern, with wire-guards outside the glass. Swing it by a light chain-pulley some little way in front of the shelves. Thus a touch sends it up or down, throwing the light wherever it may be needed.

The fine invisible dust which oozes into every space not hermetically sealed will get into a linen-closet in spite of all precautions. Therefore wipe off the shelves of it once a month, with a clean cloth dipped in boiling water, and wrung very dry. As to finish, the shelves may be merely sandpapered and varnished, but are better painted white. In damp weather open the linen-closet an hour each day. Rose-leaf sachets give the linen an exquisitely delicate fragrance. Gather freshly opened petals, dry them in the shade, and when thoroughly dry mix with half their own bulk of dry lemon-peel and calamus-root —both grated. Strew the mixture thickly over sheets of wadding, and tack the wadding between either cheese-

cloth or china-silk. Fasten the sachets to the closet-walls or lay them along the shelves. Now and again give them an hour's sunning. It freshens them wonderfully, and brings out the odour anew.

Housemaid's and Lamp Closet

A housemaid's closet is most conveniently located either in the back hall or just off the kitchen-door. The best shape for it is the corner-cupboard, with the lowest shelf about table-height. There should be shelves above—for dust-cloths, dust-pan and brush, whisk-brooms, polishing-cloths, polishes, wax, scrubbing-block, scrubbing-brushes, indeed, the whole paraphernalia of housekeeping. Upon the door there should be hooks near the top, from which brooms can be hung. Underneath the shelf keep two fibre-pails, one big, one little. They can sit one in the other, with mops and floor-cloths on top of them. This will leave space in even a shallow cupboard for a demijohn or glass oil-can. A pair of very sharp smallish shears ought to hang beside the lower shelf for trimming wicks when lamps are filled. They ought to be filled on the shelf, which may be some inches wider than those above it. Only the lamps proper should be brought there. Chimneys, shades, and ornamental bases must be left elsewhere. Set the lamp to be filled in a clean shallow pan; then, if the oil runs over, it neither messes the shelf nor is wasted.

Clothes-Closets

There is sex in clothes-closets. A man's is distinctively unlike a woman's. It needs not only hooks in plenty, but a stout pole some way from the back, over which trousers may be so laid as to preserve and heighten the cherished fresh creases. It needs, further, side-

shelves for waistcoats, extra depth for cross-hanging of coats on coat-trees, wide shallow shirt-drawers, and specially contrived spaces for hat-boxes, to say nothing of boot and shoe room and a small drawer for handkerchiefs and ties.

Given all these, a man with neat impulses may keep himself in a fair estate of clothes. Since his closet is likely to be crowded full, the wall-finish must not rub off. This makes the white-lead finish, well varnished, imperative; also the puttying of all cracks big enough for moth or dust to lurk in. After all that is done the closet should have a weekly dusting, along with all its contents, and, twice a year, a going over with a very soft paint-brush dipped in turpentine mixed with its own bulk of kerosene. This for moth-prevention. Be careful to leave the closet empty until the softened varnish has had time to harden. Work quickly with the brush so as not to streak the varnish, nor leave the paint in ridges behind it.

This is the treatment for a clean clothes-closet, regardless of sex. A woman's closet, however, needs ever so much more elaborate appliances to properly accommodate her finery, and at the very least four times as much space. At one side it should have broad shallow drawers, coming almost waist-high, and long enough to hold a skirt without folding. Above them there should be a shelved press closed by doors, and divided into square or oblong compartments. These are for hats, bonnets, and waists too frail to bear their own weight. One end ought to be cut up into tiny cabinets, each just big enough to hold a pair of shoes, stuffed lightly with tissue-paper.

Such a closet takes up about one side of a dressing-room. Over against it there is a press full of drawers and shelves for all manner of dainty underwear. Very elaborate tea-gowns and extra-crushable skirts are swung to the ceiling upon easily lowered pulleys working over hooks. Thus it appears that the proper housing of my

lady's fine wear is no light matter. Meditating upon it, one wonders how on earth Queen Bess kept her three thousand gowns—if she carried them about with her on royal progresses or left them scattered through her palaces—only less numerous than her lovers.

In closets of this sort almost every fine frock has its own special winding-sheet of muslin, soft and fine. For hanging skirts the winding-sheet, or, rather, bag is bell-shaped, so as to cling without crushing. Since all these things are for the favoured few, pass we to accommodations befitting the mass. Even in the simplest sort of closet, one that is no more than a curtain swung from a broad board overhead, the careful methods of fine folk are very well worth while. Any skirt wears better if it is hung so as not to drag. The plainest bodice is worth a wire-hanger. Old sheets may save the one best gown fresh and dainty throughout a season's wear. And, instead of the cabinet-presses, one may set hats and bonnets in wooden boxes, neatly papered, and piled one on another at one end of the curtained space. Wrap each hat in a sheet of tissue-paper as it is put away. Take care that the paper does not crush plumes and nodding flowers. If there is trimming beneath the brim, put into each hat-box a pasteboard bent to the shape of a big thimble, and high enough for the small end to hold the crown of a hat well above the box-floor.

Never put away a muddy skirt, nor one very dusty. Thus the closet stays clean with a minimum of work. Whatever its shape or size or way of having its being, the white interior is best, and the filling up of crannies pays. Coloured curtains ought to have a white lining. If they run on rods, all the better. Draw them away from the front for an hour or so upon sunny mornings. Open doors likewise. Every sort of fabric and garment lasts and looks better for plentiful airing.

China-Closets

The china-closet is an every-day problem whose need of solution is often painfully acute. As with other problems, it is much simplified by the elimination of certain factors. Kitchen-ware, for example, ought to keep within kitchen bounds. Strictly ornamental things—"articles of bigotry and virtue"—in silver, silver-gilt, and cut-glass ought likewise to be confined to the buffet. Further, plate of every sort has no standing in the china-closet. Keep it in the original cases within a special drawer, or, better, a small safe, if it is massive enough to be worth much money.

Small silver in daily use is well kept in separate boxes in a buffet-drawer. Count spoons, forks, ladles, and coffee-spoons after each washing. Each and several they are so elusive, eternal vigilance is the price of full sets.

Thus reduced to its lowest terms the china-closet holds only china, glass, and heavier clay-wares. In at least half the houses it is built into the wall. This disposes of location. Home-makers have to accept the goods and the ills the landlords provide. Where choice is possible, let the china-closet be convenient to the sink. With a big pantry, set betwixt kitchen and dining-room, the china-closet is handiest inside the pantry. But, wherever located, it is imperative to have good shelves and plenty of them. Very many built-in closets have shelves much too far apart. A little money will remedy that. But it sometimes possible to make the high shelves answer by putting screw-hooks all over the under sides, and hanging there cups and mugs, little pitchers, and such small deer. Hang the saucers against the wall back of the cups by means of flat wire china-racks. There may be a double or even a treble row of the racks. In filling them study colours as much as possible. With saucers of

various sizes, put the biggest at the bottom, unless such placing ruins the closet colour-scheme.

Well arranged, and full of handsome wares, a china-closet is among the best ornaments of a dining-room. Tint the walls to match the general tone of the room, or else cover them with a very thin hard-wood veneer, accurately fitted and tacked in place with the smallest-size brads. Varnish the veneer, and keep clean by weekly wipings with a soft cloth wrung very dry out of tepid water.

Leave the shelf-surfaces plain, and cover them with linen cut to fit, and ornamented with a line of drawn work. Heavy butcher's linen is best, though the soft-toned art-linens may be effectively used. Set one shelf apart for glass, preferably the upper one. Cut the linen for it twice the shelf-width, hem it all round, then double it and lay a sheet of white wadding just the shelf-size inside it. Thus there is a light pad all over the shelf. It can be kept as fresh as the single covers, and will safeguard expensive glass. Big pieces of cut-glass, especially punch and salad bowls, may break from the jar of setting down upon a hard surface. More than that, they have been known to break from vibrations due to heavy street traffic close about the house. Jarring of any kind, indeed, may induce a fracture. The linen-pad stops all this. It is, moreover, a fit and dainty base for fine crystal. Never set anything inside a piece of cut-glass. To do so is to invite calamity. With a crowded glass-shelf, put down small pieces first, inverting them; then turn bigger pieces over them, taking care that they do not touch. But, before risking a big bowl thus upon its own margin, it is well to test it and see if it presses equally all round. The slightest inequality may mean destruction.

Pressed glass and coloured glass may be piled together with comparative impunity. But if, when the pile is jarred, any piece in it gives out a harsh rattle, it is wise

to recast it. The rattle portends breakage, since it shows that something presses unevenly. Slender-stemmed wine-glasses look pretty tied in clusters of three, the stems crossing, and suspended by bright ribbons from screw-hooks in the top. They need not hang low enough to menace other things. Claret-jugs can be likewise hung—a corner position is best for them. Salvers and other flat things may go in racks across the back. In that case the back needs a padded linen, like the shelf proper. Test hanging things by setting them swinging, so as to make certain they will not strike anything else.

Keep plates carefully sorted and piled, size and pattern together. Give big platters room upon the lowermost shelf. If it is not properly grooved, tack strips of lath along it, and cut the linen for it wide enough to go in and out. Stand the platters on edge, the biggest next the wall, graduating them toward the front. With a very high shelf-space they look prettier on end, the highest in the middle, and getting lower toward the ends. Handsome covered dishes are best set in a row in front of the flat ones. Use judgment and an eye for colour in all places. A small, clear yellow bit against a background of dull blue illumines everything around it. Almost any green so situated would be ghastly, though one particular tone of green goes beautifully with old blue.

Make the most of every good bit. That is the first china-closet commandment. The second is like unto it—it is to keep everything in its allotted space, and as clean as washing can make it. Since nothing soiled ought ever to go into a china-closet, aside from the weekly wiping, it should not need cleaning oftener than twice a year. Then wash everything in it, linens included, scrub the shelves with tepid soap-suds, rinse well, and wipe very dry; then leave the doors open for two hours, and be sure not to set anything back in it until the whole space is bone dry.

Chapter *FOUR*

House Cleaning

THE good word for house-cleaning is—make haste slowly. Better one cleaned room a day, and comfort therewith, than an epidemic of brooms, buckets, scrubbing-brushes, and step-ladders, sure to get everybody's temper on edge. Take plenty of time, but never begin before the beginning. Fretting over work to come may hinder, but cannot possibly help.

For house-cleaning a woman should wear clothes that admit of stooping, reaching, stretching, and lifting, giving as free play to all the muscles as a gymnasium dress. A thick union under-suit, no corset, a short flannel skirt sewed to a loose low-necked waist, a sweater, and overalls make up a costume in which one can climb step-ladders, scrub floors, kneel to take up carpet-tacks, lift, bend this way and that wholly unhampered. Thus garmented it is possible to do much more work than with skirts always sopping about, yet not feel so tired.

The prime necessities for house-cleaning are soap, water, and a right good will. But the cleaning will be quicker and ever so much easier if these three are supplemented with borax, washing-soda, ammonia, scouring-soap, scouring-sand, otherwise tripoli; whiting and pumice-stone, both in fine powder; alcohol, turpentine, benzine, and kerosene.

One needs, further, dust-brushes, scrubbing-brushes, a floor-brush, a whisk-broom, a couple of clean paint-

brushes—one large, one small—a big stiff broom, a soft broom, a good mop, plenty of wash-cloths, and great plenty of wash-leathers, swabs of many sorts, rubbing-flannels, a rubbing-pad, and a couple of light fibre-pails.

If there are hard-wood floors and hard-wood finishes to look after, steel-wool, otherwise fine steel shavings, which may be bought at the paint-shops, has many uses. To make the rubbing-pad, get a hard-wood block about the shape and size of a brick, except that it is deeper, have the two upper edges hollowed so it can be readily grasped, and mid-way the hollows, fasten a strip of soft leather, so as to go easily over the back of the hand. Next cover the face and sides of the pad, also the upper surface, except at the grip, with alternate thicknesses of stout flannel and wash-leather. There should be at least five layers —the first and last of them, leather. Fit each one snug, and sew it firmly, before putting on the next. Such a pad will last a lifetime, growing better all the while. It is for polishing waxed or varnished surfaces; hence, it is needless to add, must be kept secure from dust and dirt when not in use.

Cleaning Bed-Rooms

As in general house-cleaning, the bed-rooms are properly the first things to attack. In cleaning bed-rooms begin with the closets. (See Chapter on Closets.) While they are empty and airing, take down all draperies, fold quickly, and send away to be shaken—in the open air, if possible. Dust chairs and tables thoroughly, then go over them with a cloth wrung out of clean hot soda-water, following it with a flannel barely moistened with kerosene. Set them outside before attacking the bed, and cover with sheets if dust is likely to drift toward where they stand.

Empty bureau and dresser drawers, beginning with the

topmost, wipe them out with the damp cloth, and follow with a linen cloth wet in alcohol. This will leave neither odour nor dampness to prevent putting back the contents immediately. When the drawers are finished, dip the alcohol-cloth in a little powdered whiting and rub the mirror quickly, finishing by rubbing over with a dry flannel. If there are spots on wood or marble, treat as directed. (See Chapter on Restorations.) Clean the wash-stand in the same way, and, if movable, set it outside with the rest.

Wash the toilet-ware very clean, and fill commodes and slop-jars with boiling hot soda-water. Set them in the air, and leave for at least six hours. Sterilise tooth-brush holders and soap-dishes either by boiling in soda-water or by filling them with corrosive sublimate in solution (see Chapter on Disinfectants), and letting them stand an hour. If corrosive sublimate is used, the vessels must be afterward very well washed, as it is a deadly poison. It is, however, the most efficient weapon against bacterial infection and every sort of contagion.

Take off bed-linen, fold, and send to the laundry. Hang blankets and comforts to air. Beat bolster and pillows hard for a minute, then brush them all over with a clean whisk-broom. Wipe any soiled places over with a cloth wrung out of hot soda-water. Then with a clean paint-brush go over all seams and corners, barely damping them with the corrosive sublimate. It is sure death to insect-life either present or potential. Next sprinkle well with clean warm water, and lay in the sun, turning them once or twice so the rays may reach all sides.

Take off the mattress-slip, shake it well, turn it wrong side out, and look in the corners. Midnight marauders harbour there, often past finding out. If found, touch the corners with the poison solution before sending the slip to wash. Brush the mattress itself on both sides and along the edges, also under the tufts. Follow the broom with

the brush and poison, unless the mattress appears very dusty. In that case wash it all over with cold salt-water before applying the corrosive sublimate. Neither salt-water nor sublimate will leave a mark, and after them no creeping thing can live.

Wipe off the bedstead with the cloth wrung out of soda-water, then go over all the joints with the corrosive sublimate. Free the springs of dust, then deluge the ends with the poison. Since it is not volatile there is no danger in its use. It is not merely an insecticide, but a preventive of the first-class. If a room is found infested with bugs, every particle of woodwork in it, including floor and closets, ought to be washed with corrosive sublimate after a thorough scouring.

Remove pictures last of all, dusting them well, and examining carefully the backs of any hanging near the bed or couch. Clean frames and glasses with a flannel wet in alcohol. Set them in the empty closet, and lock the doors. Then dust the ceiling, picture-moulding and walls, window-blinds, cornices, and transom. Let down the upper sash while dusting, but keep the lower ones closed.

Next sprinkle the floor well with clean sawdust slightly damp. This if it is matted or carpeted—rugs must be removed before dusting the walls. Sweep up the sawdust with a stiff broom wet in hot water, and washed clean as soon as it shows much dirt. Take up the sawdust and sweep again with a softer broom, barely dampened. If the carpet is not to come up, go over it after the second sweeping with a cloth dipped in hot water and ammonia—a tablespoonful of ammonia to a quart of water. Wipe a yard or so at a time, then wash out the cloth in plain water, so as to keep the ammonia-water clean to the last. The cloth is, of course, dipped in it after washing, and wrung as dry as possible.

Next examine the walls well for loose paper, broken

places, etc. Repair whatever is found. (See Chapter on Repairs.) Wash off all woodwork, clean windows and blinds. Look after shades; if soiled, send them to wash, or the cleaner. Clean the base-board last of all. When it is dry go over it all around with the corrosive sublimate, sopping it plentifully behind bed, bureau, and wash-stand, and taking care that it runs where the base-board joins the floor. If there are pipes for steam-heat, and especially if they run up and down into other apartments, sluice the openings around them with the liquid poison. Thus one may minimise the chief plague of apartment life, which is—suffering for the bad house-keeping of one's neighbours alow and aloft.

Now half-raise the lower sash, and put down the upper ones an equal distance. Let them stand so several hours, until the room is thoroughly dry and more thoroughly aired. Dust it well before putting back anything. Hang the pictures first, while there is a clear sweep at the walls. Bring in the bed next, but be sure everything about it is bone-dry. Put up draperies, arrange the other furniture, and put down the lower sash. If possible to leave the room unoccupied over-night, let the upper ones stay open until twelve o'clock next day.

Carpets and Rugs

To take up a carpet properly first sweep and wipe it, then remove every tack, and carefully fold one-half the carpet back upon the other. Sweep the exposed under-side with a stiff broom well dampened, fold again in half, and sweep the under-side. Repeat until the whole carpet is in a handy pile, which can be lifted in taking away. It is vandalism of the worst sort to drag out either rugs or carpets. Take up the lining, one breadth at a time, beginning at one end, shaking and brushing free of dust, but very gently, and rolling up the length as it is cleaned.

Number the rolls consecutively, so there will be no uncertainty in refitting. Lay them out to air, then sprinkle the floor thickly with clean, damp sawdust, and sweep with a stiff broom. Take long, sweeping strokes and keep the broom low, so as not to raise dust. Follow the sweeping with a good washing. Do not splash water on the floor; it is sure to mar the base-board, and likely to damage the ceiling underneath. Use a soft, coarse cloth, and warm water with a handful of soda in it, and finish by wiping with a cloth wrung very dry out of clear hot water.

Steam carpet-cleaning is no mysterious process as many housewives mistakenly suppose. The carpet-cleaner is unquestionably a boon; still, all he does is to put dirty floor-coverings into a huge drum with slatted sides and open bottom, which steam revolves at a high rate, while arms inside the drum beat and whip out the dust, which a blast of air carries away. Thus it is plain steam-cleaning is only a very perfect way of carpet-beating. In a city house or apartment it is well to have recourse to it. But if one has a back-yard, or even a floor-space big enough to spread out a carpet, it can be cleaned at home even better than abroad.

With a grass-plot, stretch the carpet smoothly over it, right side down; then, with long limber rattan-switches, whip it steadily for an hour. After the whipping sweep the wrong side twice with a wet broom, and finish by going all over it with a cloth wrung out of ammonia and water. Fold one-half over upon the other after this wiping, then take a very fine, stiff, whisk-broom, and brush all of the right side visible. Now tie a double handful of either wheat-bran or sawdust loosely in the middle of a double square of cheese-cloth, dip the swab thus formed in clean ammonia-water, and rub the carpet-face hard with it until the swab is dirty. Wash in plain water, then dip again in the ammonia-water, and keep on rubbing until

all the surface is washed. Fold the carpet again, brush and wash the next quarter, then turn over and clean the last quarter. Hang to dry and air, taking pains to hang it straight. The bran-swab is an excellent thing to clean a carpet upon the floor. If the colours are dim and faded it may be worth while to use prepared ox-gall, a tablespoonful to the gallon, in the water in place of ammonia.

Brush rugs twice upon both sides, then whip on both sides, and brush again. Hang them over a line or on trestles if there is no grass-plot handy, nor a naked floor, upon which they may be spread. Do not clutch them by a corner and shake like mad. That fetches out some dirt, but not all of it, and is also apt to fetch away part of the rug-fabric. With grass and a sunny day, after brushing and beating, spread the rugs perfectly smooth, then sprinkle them lightly one at a time with tepid water through a very fine hose or atomiser, and wipe off with a soft clean cloth before the water has time to soak in. If a rug is very dirty, lay it in the sun, and shake clean hard-wood sawdust thickly over it, let it lie six hours, then sweep off with a stiff, clean broom, and finish by going over with a towel wrung out of hot water, and pinned tight over the broom.

Rugs with white or very light grounds may be cleaned by sprinkling with corn-starch mixed with one-sixth its bulk of prepared chalk. Let the starch remain several hours, and brush it out with a fine whisk-broom, then hang in the sun, and beat well before putting down. This method is recommended for fine silky rugs, as it injures neither tint nor texture, and makes a beautifully clean surface.

Window-Washing

Begin with the blinds, whether inside or outside. Brush the dust from the slats, corners, etc., with a stiff bristle-brush, following it with a damp clean cloth. If

the sashes are removable, take out a window at a time, wash, wipe, and set in place—thus mistakes are impossible. With weighted sash, provide a stout leather belt for the window-washer, with a strap either side, ending in a snap-hook. Fasten staples in the window-frames a foot above the sill. With the hooks snapped in these staples, one may sit in even a fourth-story window without any risk. It is, then, a mere matter of sliding sash up and down. Since a dollar will supply belt and staples, they may be reckoned the cheapest form of life-assurance.

Dust sash and glass very well before wetting. Wash the sash first with borax soap-suds or borax-water, and dry quickly with a soft, thick cloth. A Turkish towel is admirable—all the more so if it is worn to rags. Do not slop. On the other hand, have plenty of water in your pail. Wring the wash-cloth dry, but be sure it is clean, and do not slur spots nor fly-specks. Keep the wash-cloth off the glass as much as possible.

For the glass use any one of several excellent scouring-soaps, specially made and provided. Lacking them, make one by dissolving in a water-bath a cake of good white soap, and stirring it thick with powdered and sifted whiting, mixed with its own bulk of fine sand, and one-fifth its bulk of powdered washing-soda. Rub this to a thick lather with a clean cloth and tepid water, cover the glass with the lather, a pane at a time, remove the lather with another cloth wrung out of clean water, and dry, and polish with crumpled newspaper. The same treatment answers for mirrors. If the mirror surface is large two can work at it better than one. Cover it evenly and quickly with the lather, and let the rinsing begin before the lathering ends. Turpentine will remove putty or paint-spots from a glass surface.

Washing Paint

All the caustic alkalis deface every sort of paint. Hence in washing painted surfaces one should use borax-soap or borax in powder, reinforcing both with liquid ammonia for very dirty paint or whiting mixed to the thickness of cream with tepid water. Half-fill both the pails, one with hot water, one with tepid water, put a clean cloth in each, and provide additional dry cloths, as well as a small blunt-pointed wooden paddle for cleaning out corners.

Brush off every speck of brushable dust, then cover the painted surface, whether wall or woodwork, with the whiting cream, rubbing it well in with a coarse flannel. Wash it off before it dries with the pail of hot water, rinse with the tepid water, then rub the painted surface dry. Finish one space before beginning another, and, above everything, beware of slopping. For corners and curves fold the wash-cloth over the point of the paddle, and rub hard with it. Work with the grain of the brush, and do not rub hard enough to deface the painted surface.

Cleaning Enamel Finishes and Hard-Wood

Enamel finishes require to be well washed in clean warm water, using the merest suspicion of soap or scouring-sand upon dirty or grimy spots. Afterward they must be rubbed with flannel hard enough to make them very hot. This develops lustre in them quite as it does in hard-wood. Grained and varnished imitations of hard-wood are best cleaned with borax soap-suds, never letting water touch them, but rubbing well with cloths wrung very dry. Afterward they should be rubbed with

a flannel barely moistened with kerosene. If there is too much kerosene, it will dissolve and blur the colours.

Clean hard-wood with a flannel wet in turpentine, and rub afterward very lightly with boiled linseed-oil. Take off spots with fine sand mixed in oil. Apply it with a leather, and rub with clean leather afterward to bring back the polish. Once in two or three years hard-wood ought to be well washed in borax soap-suds, then rubbed dry, lightly oiled, and rubbed with leather polishers until the surface burns the hand.

It cannot be said too often nor too forcibly that, in every kind of cleaning, the very first thing is to brush or wipe away every particle of loose dust.

To Clean Matting

To clean matting, sweep it twice—first with a stiff broom, working along the grain of the straw, then crosswise with a soft broom dipped in warm water, and shaken very dry. Dissolve a handful of salt in a big pail of tepid water, and wash the matting quickly with it, rinsing with clean water. This brightens all sorts of coloured matting, and also saves it in a measure from fading.

Very light matting is best washed, after sweeping, with weak borax-water, or, rather, with cloths wrung out of it. Anything whatever slopped upon a matted floor makes the last estate of it much worse than the first. Dust invariably collects underneath, and, once wet, shows through in ugly dark splotches. Cover grease-spots thickly with prepared chalk wet with turpentine, let the mixture remain for two days, then brush off with a stiff brush. If the spot is very big and very greasy, put one-eighth as much washing-soda as chalk, and mix with water to the thickness of putty.

Little-used matting, as in spare chambers, or upper summer-rooms, should be swept very clean, then wiped

with a cloth wrung out of sweet milk. Do this once a year; it keeps the straw live, and to a degree pliant. If the milk-wash is used in a living-room, or on a piazza, follow it by a wiping with very hot clear water, to keep the floor from drawing flies.

Floors

Tile, mosaic, brick, and stone floors require the same treatment—washing with warm soap-suds whenever they are dirty, rinsing well, and rubbing dry with a thick clean cloth fastened over a flat mop. This is far and away better than the special dry mops sold in the stores. They are for the most part loose ends, which are shed plentifully at every stroke. For any sort of floor-cleaning one needs a handy knee-pad. It should be barely big enough to kneel on, yet thick enough to save the kneeler from cold, dampness, and sore joints. The pad is especially required in cleaning tile-work or mosaic. Indeed, to do such work habitually without it is to invite rheumatism and all its hosts.

Any sort of floor must be well swept as the first step in cleaning. Never mop a stained or painted floor, neither wet it all over at once. Begin at the side furthest from the door, wash a strip say three feet wide, lengthwise the boards and the depth of the whole room. Use borax soap-suds with a little ammonia, and have the water as hot as can be borne. Wet a floor-cloth a yard square, wring it lightly, double it, spread it smooth in the farthest corner, then catch it in both hands, and, keeping it flat on the floor, go backward the length of the room. If the floor is very dirty, wash out the cloth and go over the strip again. Next take a clean cloth, wring it hard out of clear hot water, and draw it the same way all over the washed strip. Then, with a third cloth, clean and dry, wipe the strip, beginning in the corner and working

backward. If the work is properly done there will not be a mark or track upon the clean surface. Repeat until the whole floor is clean. By ending at the door, there is nowhere a blur.

Both stain and paint look and last better if rubbed when fully dry with a flannel barely moistened in kerosene. A stained floor can be oiled the same as hard-wood, but must be left untrodden for twenty-four hours afterward. Care must also be taken not to leave streaks of free oil anywhere on top; they draw out enough of the stain to make ugly marks. Full oiling is unnecessary oftener than once in three years. If a stained floor is to be waxed, wipe it free of dust, soften the floor-wax in a bath of hot water, dip a flannel cloth in it, and rub very quickly all over. Spots and stains must be cleaned before beginning. (See Chapter on Restorations.) But a few spots do not make it necessary to rewax the whole floor. Simply wax over the cleaned place, and rub hard enough at the edges to blend the new wax with the general surface.

Bare boards—either pine, poplar, white-wood, or any of the hard-woods—can be brought to a very handsome finish with nothing beyond time and care. Wet them sparingly—water swells them and loosens the seams. A quarterly wiping and rinsing is enough. In between sweep thrice a week, using a soft, clean broom or bristle-brush, and mop after with a bit of Turkish towel pinned snugly over a stiff, stubby broom. A regular floor-brush, such as is a necessity with hard-wood floors, will answer even better than the towel. Such a brush is broad, flat, made of the very best bristles, with a weighted top, and a handle set at a very decided angle. It needs to be kept very clean of dust, hence should be wrapped in a clean cloth when out of use. Rub the floor with it weekly, going up and down with the grain of the boards. The less a bare floor is wet, the quicker it takes on the polish and the darkness of age.

Water should never touch a waxed or oiled floor, no matter what the wood. Even a few drops spilled will leave marks unless instantly removed. Sweep such floors twice with the bristle floor-brush—not the weighted one; go over afterward with either a dust-mop or a broom pinned inside a towel, then clean and refinish spots or stains, and complete the cleaning by going over the whole floor with a flannel wet in turpentine, then a dry flannel or a flannel-mop, made by tacking the coarsest woollen cloth upon the bottom of a square mop-board, in such manner that the cloth stands in deep tucks between the rows of tacks. This is much easier than hand-rubbing. Finish by rubbing with the weighted brush.

A queen among house-keepers once summed up house-cleaning, and especially floor-cleaning, as "simply a matter of common-sense and elbow-grease." Both are sufficiently rare to make a perfectly cleaned house a thing of wonder and delight.

Cleaning Furniture

Wash willow and wicker in natural finish with a scrubbing-brush and plenty of warm borax soap-suds, and dry quickly—in the sun, if possible. But first dust thoroughly, and look after stains and splotches. Dry-clean varnished or enamelled wicker by rubbing it hard with a swab of prepared chalk and very fine hard-wood sawdust, tied tight in a square of cheese-cloth. When the cloth gets dirty put its contents into a fresh piece. After the rubbing, brush hard with a soft bristle-brush. Rub very dirty places with a swab of tripoli as big as the end of the thumb, dipped as lightly as possible in boiled linseed-oil.

To clean upholstered furniture, cover the stuffing with a towel and whip with a rattan, shaking the towel whenever it grows dusty. Wash all visible wood in tepid

soap-suds, dry it very quickly, then rub hard with a flannel and a few drops of kerosene. This for walnut, cherry, and oak in any finish. Mahogany needs to be merely wiped with a damp cloth, then rubbed for half an hour with a clean flannel.

Brush the upholstered parts very hard, then wipe them quickly with a cloth wrung very dry out of clear hot water. Follow this with a clean white flannel dipped in alcohol. As soon as the flannel shows dirt, wash it clean in tepid water. Otherwise the alcohol will dissolve out the dirt, and deposit it in streaks upon the surface of the fabric.

Clean out tuftings with a little swab of cotton-wool tied on the end of a stout skewer, and wet in alcohol. Throw away the cotton as soon as it gets dirty. Clear alcohol lightly used will not mark the most delicate brocades. The swab must not be wet enough to trickle under pressure.

Clean the intricacies of carved work with the same sort of swabs, but take especial pains not to have them too wet. With very delicate carving, one must sometimes have recourse to a sand-blast, using very fine tripoli, and small hand-bellows. Direct a quick stream of sand against the carving. In flying back from it, the sand brings away the dust.

Clean gilt furniture with sifted whiting made into a cream with alcohol. Cover a small space at a time, and rub off before it hardens. If a spot sticks, touch it very lightly with clear alcohol. If there is much dirt or deep tarnish, wash quickly with borax soap-suds, wipe dry, then cover all over with the wet whiting, and let it dry. Brush it off with a stiff brush, and polish afterward with a soft leather.

This is the best way of cleaning all manner of gilt frames. With very big ones, cover the floor with a sheet, then lay the frame flat, and leave it thus until after the

brushing. A gilt frame, specked but untarnished, needs to be rubbed with a flannel wet in alcohol, and polished afterward with a soft leather stretched smooth over the palm.

Brasses—as knobs, handles, and upon modern furniture—are commonly lacquered, so can be cleaned with tepid soap-suds and a soft cloth. Damp the cloth in place of wetting it, and rub quickly. Unlacquered brass can be cleaned in various ways. One of the best is to wash it well in warm soap-suds, then rub with salt and vinegar, using a flannel swab, and polish afterward with dry whiting and a clean cloth. Take care not to let the acid and salt touch the wood. If the brass is either open or intricate, it is better cleaned with tripoli mixed to a soft paste with sweet oil. Rub hard and quickly, and polish afterward with tripoli in powder.

Hangings

Shake each length separately, and hang straight over a line or trestles, right side under. Whip the wrong side hard—a dog-whip or riding-whip is better than a rattan. Brush the wrong side hard, and wipe it quickly with a damp cloth; then turn the hanging, brush the right side well, and hang it in the air. Plushes and brocades must be brushed up and down—with the warp, never the woof. Anything with a nap or pile should be brushed with, not against it. Lace and muslin hangings can be very much freshened by folding them smoothly down after shaking well, and sprinkling all the folds thickly with powdered corn-starch and magnesia. Let them lie all night, then hang for some hours in the sunshine, and whip well. The starch beaten out takes much of dust and grime with it. Use judgment, of course, in the shaking and whipping; still, even with rough handling, such a dry-cleaning does not injure the fabric as much as washing. Delicately

tinted things, as silks, cotton crapes, and so on, come through with their colours safe. This is in itself no small advantage, to say nothing of keeping their shape.

In the Garret

Neither garret nor cellar should be, as it too often is, the privileged abode of disorder. Both should be cleaned half-yearly. House-cleaning, indeed, cannot begin in a better place than the garret, since, before it ends, a good many things are likely to be sent there. Unless the garret is hopelessly cluttered, give it a coat of whitewash every spring. It need not be emptied; simply set things aside while going over one end, finish it, clean the floor, and cram everything into it, while the other end is made fresh.

Keep garret windows open, but fully screened, all through the hot weather. A frill of cheese-cloth tacked to the top of the screen-frame lets in air plentifully, and keeps out much dust. In spite of it, enough dust will get through to make a monthly sweeping worth while. No house can be daintily clean with a reservoir of dry dust at the top forever sifting down.

Garrets are made for keeping things—but not all things. Old shoes, for example. Bury, burn, give away, or sell them. With a single tree at hand it is sinful to keep the shoes out of the ground. Put them at least two feet down—nature and the tree-roots will do the rest. A grape-vine will transmute old leather into the fairest fruit and rank green leaves. In the range, under a layer of coal, old shoes make the very hottest ironing-fire. Lastly, the junkman will take them, sometimes for a "Thank you," and sometimes for coin enough to buy the young people sweets. Either way they are well bestowed —very much better than in hopelessly cumbering floor-space badly needed for other uses.

It is foolish and dangerous to litter a garret with packing-stuff—straw, excelsior, wrapping-paper, and so on. If such things needs must be kept, make them into compact bundles, wire-bound, and plainly marked. A spark or dropped match is then no menace to life and property. Fires in thousands have been set by a spark or match falling among such substances. If the bundles are boxed, and set as far as possible from the windows, all the better. The garret, a sort of catch-all, is apt to be littered all over when cleaning begins. It cannot begin better than by thus lessening a very real danger.

Gather up pamphlets, loose papers, and throw them in a barrel or big box, to be sorted over some rainy day. Pile up bound books neatly, or, better, set them in shoe-boxes, then place the boxes one upon another to form a rude book-case. Still, it is rather pitiful to keep books of any value sequestered in a garret. They had much better be given away. Books of no possible value should go straight into the furnace or the range. For bad books are distinctly the world's worst lumber, ill to keep, and worse to move. Throwing them away even is a task. In fact, burning them is the only way to get even a grain of satisfaction from them.

Go through clothes-chests, hooks, and racks carefully, weeding out their contents. There are so many things it is economy to throw away. Old hats, ragged furs, moth-eaten feathers, for example, which, each and several, may be a means of destruction to something of real value. Old felt hats must be exempted from the useless category. They can be turned into so many things—iron-holders, kettle-holders, rubbing-pads for waxed floors, rounds to go upon chair and table legs. Indeed, comfort wholly aside, the soft hat is distinctly a good household investment.

Wipe off shelves with a cloth wet in camphor before laying bundles back upon them. After the floor has been

well washed and dried, take a big paint-brush and a can of benzine, and paint it all over, going at least six inches up the whitewashed wall. This is a preventive measure against rats, mice, roaches, etc. It must be done at midday with no artificial light anywhere about. The windows must stand open after it, and the door leading down should be kept closed for some hours, as the benzine vapour is highly inflammable.

Chapter *FIVE*

In the Laundry

THE house-mother who has a laundry apart from her kitchen should rise up and call her home's builder blessed. Still, it is better to do the washing in a big, airy kitchen than to wrestle with it in a basement, ill-lit and poorly ventilated. It is, indeed, axiomatic, that washing is best done where splashing water can do no possible harm. Splashing in a cellar almost invariably means continuing dampness; thus, what is gained in space and kitchen tidiness is very often lost many times over in health and comfort. Dampness wholly aside, a cellar laundry is bound to mean carrying much weight up and down steps. Cellar drying is inadvisable. Daylight, even of the wannest and stormiest, is a wonderful sweetener and disinfectant.

Laundry Equipment

Set-tubs of soapstone or porcelain are immeasurably the best. The trouble is that in many cases they are too small and too few, especially in apartments. There it is rare to find more than two, whereas first-class laundrying requires at least three.

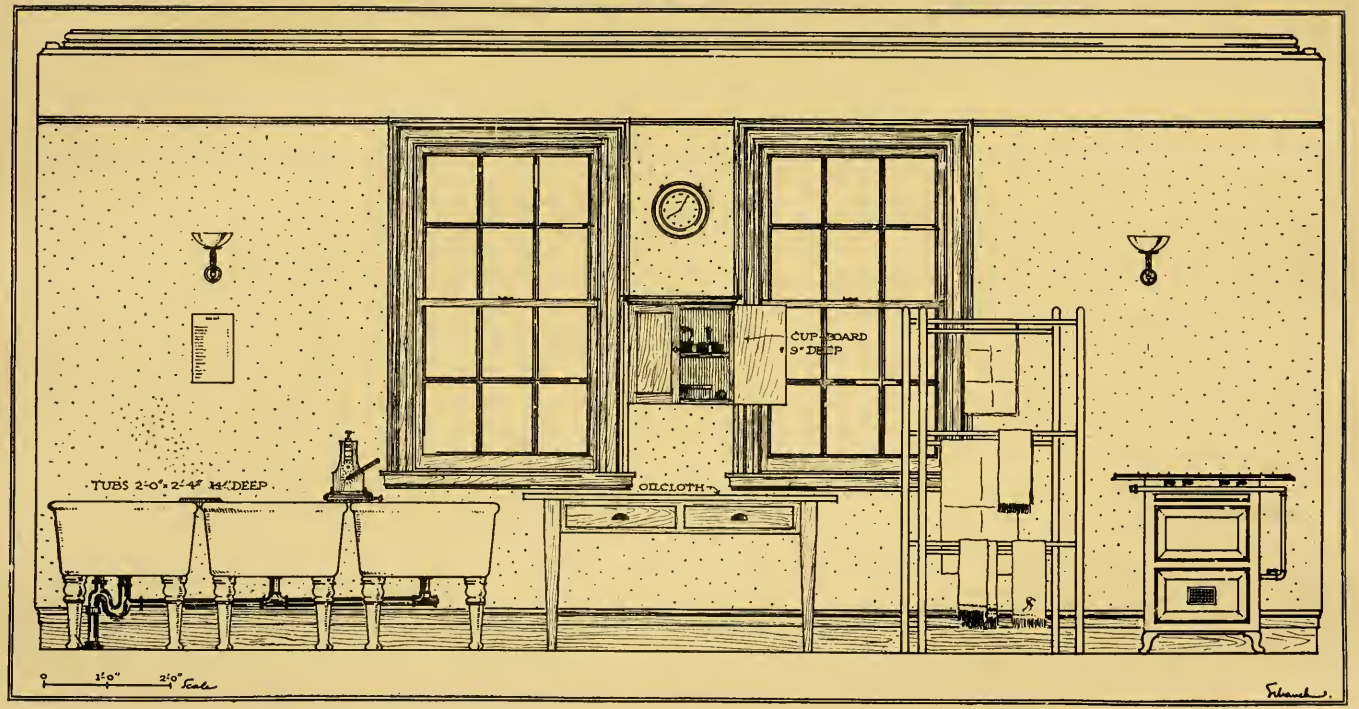
Next to set-tubs come cedar ones with brass hoops. A nest of four, fitting snugly one within another, will with reasonable care last ten years, besides being ever so much lighter and handier than tubs of pine or poplar.

Keep the tubs together between wash-days, and pour a little clean water into the upper one. This will save all from shrinking, yet will breed no smells nor mould. In use set them upon a long, stout bench, so proportioned in height to the washerwoman there will be no need to stoop much over the work. If space is scant, have the bench-legs hinged on, so they may be folded, and the bench stand or lie flat when not required.

The new glass wash-boards are clean, durable, and good for the clothes. Their one drawback is that they are a trifle heavy. Sanitarily they are far and away better than the wooden zinc-faced sort, which absorb dirt and hold all manner of taints. Indeed, it is unsafe to use wooden wash-boards unless they are carefully scalded and dried at the end of washing. One that has been used to wash clothes from a sick-room, even if there is no contagious disease, should be scalded with soda-water, and treated after to a drenching with chloride of lime. In contagious sickness, such as measles, scarlet-fever, or diphtheria, the best thing is to burn up the wash-board outright.

Wringers ought to be chosen with an eye to two things —durability and easy working. Size must, of course, depend on the tubs in use. After that, consider these things: First, how many parts? The fewer the better. Second, what sort of screws must be set? Here, again, the fewer the better. Third, the strength of the springs, the strain on them, and the sort of rubber? This is crucial, since it is the springs which insure wringing. In a general way it may be said that the simplest construction is apt to be the strongest. The length of the crank is generally proportionate to size; still, it is well to remember that the crank is, in fact, the lever through which power is applied; hence, the longer it can be without unwieldiness, the less power will be needed in the turning.

In wringing, it saves both the wash and the washer-



LAUNDRY WITH SET TUBS, TABLE, AND CLOTHES-HORSE SCREEN

woman to fold clothes to an even thickness, and exactly the breadth of the wringer-rolls. Sending things through in lumps and bunches strains the springs, and brings them quickly to the breaking-point. It is much the same with turning the crank. One vicious jerk does more harm than steady rolling on a whole wash. As soon as washing is over, dash clear warm water over the wringer, first removing it from the tub and standing it on end; then wipe it dry, put a little fresh oil on the bearings to guard against rust, and set it away in a dry place, cool enough to prevent all danger of warping.

Copper boilers are best, but cost four to five times as much as other sorts. Block-tin comes next in desirability. Next to that, a round flat-bottomed iron-pot. It is heavy, and may rust the clothes unless one is careful, but against that one may reckon cheapness, durability, and security. It does not come in holes at exactly the wrong time, as does the cheap copper-bottomed tin-boiler. The iron-pot is subject to just one danger—if cold water is poured into it while hot and empty, it is very apt to crack. But, whatever the boiler, it should never be put over the fire without at least an inch of water in the bottom.

Further, any sort of boiler must be kept clean and dry between times. Along with it keep the boiling bag, which should be of stout unbleached muslin, sewed fast at the sides, and furnished with a drawing-tape at top. Table-linen and all manner of fine white things must be boiled in it, not only to prevent iron-rust, but to keep off possible scum-stains.

Baskets and Sad-Irons

The best clothes-basket is firm and square, of light splint or willow, with strong handles. Keep a clean cloth thrice as big as the basket to go in the bottom of it, and

another smaller one, to tuck over the top. To insure the cloths being clean, provide two of each, and see to it that the spare one is washed every week. Provide also a reckless plenty of clothes-pins, with a special light basket for keeping them.

Steel-faced sad-irons with reasonably high handles, and six or seven pounds in weight, meet the greatest number of laundry needs. The variety in irons is so great, every woman should be able to find something to her mind. As, for instance, the electric-iron, which has a wire attached to the handle, and is thus continuously heated; the gas-iron worked on much the same principle by help of a light rubber-tube, and several patented contrivances whose handles never get hot. Each and all have their good points, but, when all is said, the common sad-iron is the queen of the laundry. Half-a-dozen of the six-pound weight will be none too many. There should be also two polishing-irons, two five-pound irons for thin stuffs, and a couple of the still lighter ones known as trimming-irons.

Try every one by rubbing the naked palm over the surface before buying, and reject it if there is the least roughness. It is quite as essential to keep the faces smooth; therefore do not set them upon hot coals, nor a red-hot iron, nor leave them very hot too long. High heat long continued gives rise to molecular changes that break up the surface after a little while, and make it show under the microscope numberless fine honeycomb pits. Light mats of soapstone or asbestos come in handy when the ironing-fire is too hot. Still, heat harms irons less than dirt and damp. Wash the irons as soon as they are cool enough not to hiss, rub them over with a flannel dipped lightly in kerosene, and set away. A good place for them is a stout wooden-box, set on end, with clean board-shelves across the inside. The shelves should be just far enough apart for an iron to set upright. Set

them facing inward, the heaviest at the bottom. If there is a fluting-iron, give it the upper shelf to itself, and be sure to keep the box dry and clean.

Where there is a heavy weekly wash, a small watering-pot with the finest possible rose comes handy for the sprinkling, and is ever so much handier than the tin clothes-sprinkler sold in the shops. But the very best sprinkler is a good-sized atomiser, such as greenhouse-men use for spraying plants. Choose one to fit the hand, neither too big, nor small enough to cramp it. It sends out a fine misty spray that damps clothes all over, yet makes no place sopping-wet.

Laundry-Stoves

The variety of laundry-stoves is simply without number. One that is good and cheap can be easily fitted so as to supply hot water independent of the kitchen-boiler. It has sloping spaces around the fire-pot for irons, and a specially fitted round top to hold the wash-boiler. The water-pipe is, in some mysterious fashion, coiled around inside, next the fire, then led out either to tubs or a faucet. Then there is an oil-stove, price four dollars, which will keep three irons going, and hissing hot, at a cost of less than two cents an hour. It is, withal, so handily portable one may iron in the airiest room of the house with no danger of defacing it. If gas is available, it is barbarous to iron in a hot kitchen. One of the long stoves with perforated burners, each of which heats an iron, can be set outside the door of a hall-bedroom, and prove a god-send to either mistress or maid.

Ironing-Boards and Tables

An ironing-table ought to be high enough for the ironer to bend her elbows at right angles and work with-

out stooping. In reckoning the height, allow for a thick mat or excelsior cushion under foot—it is a great economist of strength and backaches. Pick out sound deal, free of knots or warping, and see that the drawer works easily. To furnish the table properly, take first a soft, coarse all-wool blanket, fold it by a warp thread, lay the fold upon a long edge of the table, and make very smooth, then trim all round, save at the fold, exactly to the size of the table-top. Whip the cut edges lightly together as it lies, first making sure that the under-side is as free of wrinkles as the upper one. Cut a four-inch square of stout muslin for each corner, double the squares to triangles, and sew them fast. Their use is to slip over the corners of the table, thus holding the blanket in place. When the blanket is washed, take off the squares, and remove the whipping from the edges.

Make ironing-table covers of unbleached sheeting. Cut them three inches bigger than the table-top all round, hem the edges narrowly, and mitre three of the corners, sewing them fast. At the fourth corner fold back the extra cloth, stitch it down, then in the double, work a couple of eyelets either side, and lace a tape through them. By tying this tape tight, after slipping the mitred corners over the table corners, all need of pins is done away with, and a firm, smooth, unwrinkable surface assured.

Cover skirt and sleeve boards the same way—first, with double woollen cloth sewed firmly on, then with removable muslin-slips, hemmed at the small end, and laced snug over the large one. Fit under and upper covers so well either side can be used. A bosom-board is a necessity in doing-up shirts. It should be either square or shield-shaped, and smoothly covered with double flannel, with fine cotton outside. For ironing laces and embroideries, have a square of very thick card-board covered four-fold with flannel. If there are many children to iron

for, a small-size skirt-board, and several sizes in sleeve-boards, soon pay for themselves in saving time.

Provide the ironing-table, further, with either a light trivet or asbestos mat to hold the irons, a clean wiping-cloth, a shallow wooden box with salt for rubbing a rough iron smooth, a smaller box for either white wax or white soap, and at least three clean, soft holders. In addition, furnish the laundry with a folding clothes-horse of white wood, which may be turned into a screen as clean clothes are hung on it; a big starch-kettle, agate-ware or copper or block-tin; several cheese-cloth strainers, and at least three sheets of cheese-cloth to cover the clean clothes while they air after ironing.

Wash-Days

The quickest thorough washing is a long way the best. Except for very dirty things, soaking hinders cleanliness rather than helps it. But here, as elsewhere, haste is best made slowly. Sort the clothes very carefully before a piece is wet. Wash table-linen first, then bed-furnishings, then skirts, night-gowns, and so on; then coloured things, next stockings and underwear, and, last of all, the soaked bits.

Even with set-tubs two wooden ones of handy size help out amazingly. One had better be kept especially for table-linen, and for rinsing the finest white things. Use the other for soaking, but do not soak too long. An hour is enough to soften and dissolve the dirt, yet not long enough to set it all through the garment. Soaking in suds strong with soda will eat and destroy the fabric, but dirt comes out easier and without damage to the fibres if the soiled things are wet through with and well wrung out of warm soda-water before they go in soak. This wetting and wringing out will whiten and sweeten, without hurting the clothes. The caustic soda attacks the

dirt first, and is washed out or dissolved away before it has time to eat the fabric. It must not be too strong—a tablespoonful of soda to three gallons of soft water is about the right proportion. Hard water requires a fourth more soda, as some of it goes to neutralise the lime.

Keep a sharp look-out for spots and stains in the sorting. Either wet fruit-stains in alcohol, whisky, or camphor, or pour a stream of full boiling water through them. A stain once set by suds is thenceforth almost hopeless. Beware especially of grass, paint, mud, and wagon-grease marks, all of which must be taken out before washing or not at all. (See Chapter on Restorations.)

Borax-soaps, which are white and mild with but little free alkali, are the best for laundry work. Soap is properly a salt, a combination of fatty and resinous matter with an alkaline base. In a perfect soap the ingredients exactly balance, but in many of the cheaper grades there is an excess both of alkali and resin. This is why washing-powders so often play havoc in the tubs. In soap-making the heavier ingredients settle at the bottom of the vats. It is this residue, dried, crushed, and mixed with free alkali, in powder—as soda, potash, borax—that is sold as washing-powder. It unquestionably has cleansing power, but must be used with extreme discretion.

However, any decent soap, or even soap-powder, will answer if only none of it be left in the clothes when washing is over. It saves both time and strength to dissolve the soap before washing begins. Shave a bar fine, cover the shavings with water, and set over a slow fire until it becomes a jelly. Hot water takes out dirt more quickly and more readily, but cold may be used at convenience. The essential thing is to keep it the same temperature all the way through. Indiscriminate alternations of hot

and cold "full" all sorts of fabrics, and make them dead and coarse-looking. Lukewarm water is best until one comes to the boil. Fill the boiler with cold water at the minute of dropping in the clothes. Take them out after twenty minutes' boiling, and drop them into a cold rinsing water. Rinse a second time in lukewarm water, and have the blue water of the same heat. Remember the drier and quicker the wringings, the whiter the clothes. It is the remnant suds and dirt which make them yellow, and it is almost impossible to rinse out the suds if they are left to lie long.

Kerosene in the boil whitens clothes safely, especially such as are yellow from long lying. Use a tablespoonful to a gallon of water. For things very yellow or grimy, make an emulsion of kerosene, clear lime-water, and turpentine in equal parts; shake together until creamy, then add a cupful to a boilerful of clothes, and keep over the fire half an hour. The same emulsion is good for very dirty things, as jumpers, overalls, working-shirts, children's trousers. Use it in conjunction with very strong suds, as hot as the hand can bear, and rub it well upon the dirtiest spots. Leave the clothes five minutes before washing out, and be sure the second suds and the rinsing waters are as hot as the first suds.

Drying Clothes

It is nearly as essential to hang out things properly as to wash them well. If big things, such as table and bed linen, dry out of shape, stretching and pulling them straight wears them more than use. Hang sheets, tablecloths, towels, and napkins evenly across the line, ends down. Warp-threads are so much stronger than woof, if things are habitually hung out lengthwise they will certainly split along the fold. Indeed, all washable things should be so hung out that the weight while wet—which

is thrice the weight dry—comes upon the lengthwise threads.

Take pains to hang out shirts so the bosoms will not drag. Once the several thicknesses dry in creases, it will be hard work to get them back in shape. It is the same with cuffs and collars. Snap them out straight, and hang so warp and woof pull true. All these stiff and polished things need to get bone-dry before starching. They also need to be well wet in blood-warm water before rubbing in the tubs. Stiff linen is nearly as breakable as cardboard, especially the fine sorts used in good shirts.

It is not hard to do up shirts when once the knack is learned. After washing and drying comes starching. Make the starch by rubbing one tablespoonful of dry starch smooth in a little cold water, then stirring it into a quart of freshly boiling water. Let it cook about two minutes, stirring all the time. When it turns from white to a translucent blue, it is done. Add to it a bit of white wax, paraffin, or spermaceti, as big as a nutmeg, a teaspoonful of salt, and two tablespoonfuls of thick gum-Arabic water. Use only the whitest gum, and put four ounces of dry gum to the quart of water. It may be made in quantity, and kept for use bottled and tightly corked. Cook the starch a minute after all the other things are in, stirring it hard, and taking care not to scorch it. Scorched starch not only taints the whole house, but gives the clothes an ugly tint and a very bad smell, which it will take several washings to remove. Strain through double cheese-cloth while boiling-hot. Make a cupful of very strong bluing-water, and stir in enough of it to colour the starch rather deeply.

Fold a shirt-bosom lengthwise down the middle, dip it in the hot starch, and rub and knead with both hands until sure the stiffening has gone well through it. Wring very dry, and hang out as smooth as possible, then look the bosom carefully over, and wipe off even the least

smear of oozing starch. If there are air-bubbles between the linen and the backing, stick a pin in them and press the plies together. Starch cuffs and collars in quite the same way, taking especial pains to have them dry straight. Leave on the line until full-dry. For sprinkling, lay flat on the table, bosom up, dampen the whole side thoroughly, but do not make wet; then fold the sides and sleeves over the bosom, dampen the under sides and roll up tight, beginning at the neck. Let lie an hour.

The Way to Iron Shirts

For ironing fold the shirt straight down the middle of the back, and iron the body smooth, taking care to move the iron mainly straight with the warp. Next fold a sleeve flat along the sloped seam, and iron it upon both sides. Iron first through the middle, then take hold of wrist-band or shoulder with the left hand, and hold taut while the iron goes quite to the join. Open the wrist-band, lay it flat, and iron hard upon the wrong side, then turn and press upon the right side. Next iron yoke and neck-band. Then comes the tug-of-war—otherwise ironing the bosom.

First fasten the neck-band properly, next slip the bosom-board inside the shirt, and spread the bosom smooth upon it, pressing it out simultaneously with both hands. With a thin clean cloth wet the whole linen-surface lightly with weak raw starch. Rub it in very well, and, if any place feels sticky, wipe it off with a cloth dipped in tepid water. Have the iron hot enough to yellow dry cloth if left to stand on it ten seconds. Begin at the bottom of the bosom and iron straight toward the neck, up the middle, holding the neck-band in the left hand, and pulling hard against the iron. Here as much depends on the left hand as the right—the knack lies mainly in knowing how to pull properly.

If the bosom wrinkles, or forms one of the warps known to laundresses as "cat-faces," wet the place with clear water, stretch it smooth, and iron over again. Rub the iron over with white wax before beginning work, also in the salt tray, to insure a perfectly smooth surface. If the starch is right, properly made and applied, it will not stick to the face. But if a yellowy crust forms upon the iron-tip scratch it off with a blunt knife, and be sure to wax and salt-polish the iron again before setting it on the shirt.

When the whole bosom is smooth, and nearly dry, take one of the polishing-irons, not quite so hot as the others, rub the face of it with either polishing-wax or white soap, and press the bosom hard all over, bearing hardest upon the rounded iron-point. Iron and polish cuffs on a flannel-covered board. Wet them also with raw starch, or, more properly, starch-water, press first upon the wrong side with a very hot iron, and turn upon the right side only when nearly dry.

Washing and Starching Prints

Before a new print goes into the tub, set the colours. The way of doing that depends on the colours. For green, blue, pinkish purple, mauve, and aniline reds, soak ten minutes in alum-water, using four ounces of alum to a tub of water. For the madder tints, soak in sugar-of-lead solution—an ounce of the salt to a gallon of water. For black, black and white, grays, and deep purples, dissolve a handful of coarse salt in a tub of water, and soak about seven minutes. Some blacks are made fresher and more permanent by putting strong black-pepper tea into the first suds. It is best to try the colour of anything by wetting a small piece in the various solutions, and using that from which it comes out brightest.

Prints should never be allowed to get so dirty as to

demand soap. But if they do get very dirty use borax-soap, but do not let it touch the cloth. Make a strong suds, as hot as the hand will bear. But never let boiling liquid touch any printed surface. Borax, in proportion of a tablespoonful to the gallon of water, is a milder cleanser, and in most cases efficient. Wash through it quickly, rinse twice, in water a little cooler than the first, and wring as dry as possible. Never stop for a minute—standing after wetting is what makes colours run.

Prints merely crumpled and dusty had better be washed with wheat-bran than soap. Tie a quart of the bran loosely inside a piece of cheese-cloth, and rub the prints with it as though it were a cake of soap. Press the bran-swab well into all folds and gathers, wash the clothes rapidly in the water, which will be milky-looking, and should be barely lukewarm so as not to cook the starch washed out of the bran. With very dirty frocks a fresh bran-swab may be needed. For dark grounds or black put a handful of salt in the bran-water. Rinse in three waters. Blue the last of them if there are white grounds or much white in the pattern. For buff, brown, or cream grounds, colour the last rinse-water with either strained black coffee or strong hay-tea. To make the tea, boil a lock of bright timothy hay in a gallon of water, strain, and bottle, adding enough alcohol to the bottles to keep them from souring.

Sunshine bleaches out a wet print, often fatally. Notwithstanding, prints cannot be dried too quickly. Never hang a printed skirt double over the line. Fasten the band over a wooden barrel-hoop and hang in shade. Lacking a hoop, stretch it around the backs of two chairs set face to face, letting the band come in the middle. Let all sorts and conditions of coloured cotton and linen dry thoroughly before starching. Mourning prints should have the special black starch sold in the shops. Make yellow starch for yellow and brown prints, colouring it

with either coffee or hay-tea. For white grounds have the starch rather blue, and less than half as thick as that for shirts.

Turn everything wrong side out before dipping in the starch. Knead and rub the starch well through, but never let it run upon the right side. Dry quickly, but still in the shade, and do not take down while one thread is moist. This is for thick things—prints, chintzes, ginghams, chambrays, linens. Airy muslins, organdies, batistes, and so on, require different usage. The best starch for them is clear thick gum-water, white gum-Arabic, or gum-tragacanth. Dip them wrong side out, rub the gum well through, and squeeze dry, but do not wring. Spread as much as possible, and leave until the surface feels limp and a little sticky, neither wet nor dry. Take down, roll tight, and cover with a clean cloth. Unroll a breadth at a time, and pat and clap between the hands until quite dry. This is "clear-starching," no end troublesome, but worth while, since it is the only process that restores the clear, fresh new look to thin fabrics.

Sprinkle a clear-starched garment very lightly, but evenly. Wet splotches upon a semi-dry ground ruin everything. Any fabric that hisses under the iron is too wet. Thick prints take much more water than muslins, but excess is quite as harmful. Leave any sort of print tightly rolled at least an hour after sprinkling. Cover it so thickly the outside cannot dry. To iron a skirt properly is in the nature of high art, especially in these days of tucks, ruffles, and flares. Iron the trimming first—unless it chances to be ruffles that are to be fluted later. Press tucks first along the line of sewing—any sort of sewing draws for wetting. Hold the tucks hard with the left hand, after smoothing perfectly, and go over them with an iron just below scorching heat. If they run around, press them out on the table; if up and down, slip the skirt upon the board, and iron the whole tuck-

length at once. At the belt press the iron-point well up among the gathers, holding them in the left hand while the right moves the iron.

Iron untrimmed skirts first all over upon the wrong side, turn and press very lightly upon the right. Never iron anything out of shape—that is, with the threads pulled out of their proper right angles. The best way to keep from doing it in ironing waists, yokes, etc., is always to iron with the warp-threads, and hold them straight in front of the iron.

Washing Curtains

Thin curtains—Madras, bobbinet, muslin, or Nottingham lace—should be shaken free of dust, washed in warm suds, squeezing, and laving up and down in place of rubbing; boiled, rinsed, blued, or yellowed; lightly starched while still wet, and dried as quickly and as straight as possible. Instead of ironing, baste broadish hems at top and bottom, and run into each a stout unpainted curtain-pole, as long as the curtain is broad. Stretch the curtain smooth upon the pole at each end, then hang up, sprinkle well, and let dry. The weight of the lower pole will straighten and smooth it. Repeat until all the curtains are dry, then rip out the hems, and press lightly with a warm, not a hot iron. If there are wrinkles or cat-faces after hanging the curtains, wet those spots, and pull down hard upon them. Usually they will dry out as smooth as need be. Ruffled curtains can have the ruffles fluted after coming off the pole. If hanging is impossible, simply stretch the curtains between the two poles. Take care that the poles are very smooth, and stout enough not to spring.

Real-lace curtains after washing can be pinned out upon sheets spread upon the floor—tedious work, but worth while. Pin the corners first, drawing them very square,

then stretch every scallop in line with the corners and pin it fast. After all are pinned, go over the whole curtain with a soft damp cloth, patting it hard enough to remove the least trace of starch. This makes the curtains look quite new, and does not wear them in the least. But with several pairs it is apt to be impracticable—then the recourse is to frame-drying. No sort of lace should ever be ironed, not even upon a mangle.

For the frames, get clean stout deals, one by two inches and twelve feet long. Saw some in half for end-pieces. Bore half-inch holes four inches apart for two feet from each end. Have also some half-inch wooden-pegs long enough to go through two of the deals at once. Let the curtains half dry upon the line, hanging them as straight as possible. Take down a pair, pin scallop to scallop from top to bottom, and hang the pinned part over one of the long deals. Now pin the low edges as accurately together, slip inside them another long deal, stretch the breadth of the curtain apart, lay on a short end-piece, bringing the holes in it over holes in the side-pieces, and fasten with pegs. Likewise stretch the other end; then with a needle and coarse thread fasten the ends of the curtains to the cross-bars. Stand on edge in an airy place to dry. Six frames, or three pairs of curtains, will thus take up less space than one curtain spread out full-size.

Stockings and Underwear

To wash silk stockings and underwear, first soak for ten minutes in fairly strong borax-water, then wash rapidly, rubbing as little as possible, through good white soap-suds about blood-warm—that is to say, about 98 degrees. Hotter water makes knit-silk harsh and crinkly. Squeeze out the suds, but do not wring. Rinse through two waters of the same temperature as the suds, and hang to drain and dry without wringing. Hang

shirts and drawers smooth, and pull the sides a little apart, but not out of shape. As silk dries, so it is apt to wear. White silk needs a little bluing in the last water. Coloured silk is best left without.

Do not sprinkle knit-silk to iron it. Wring a thick towel out of clear hot water, fold up the dry garment in it, and let lie an hour. Make very smooth upon the table, and press lengthwise with an iron just below scorching heat. Fold stockings wrong side out, along the seam, and press from the seam outward, taking care not to wrinkle the under side. Fancy lace-woven stockings in white and light tints need to be cleaned in a flood of benzine. Lay them flat in an earthen dish, and deluge them first upon the wrong side. Wash up and down, until the benzine is dirty; then lay in a clean dish, right side out, and pour on more benzine. All that remains is to air them sufficiently to remove the smell, which commonly requires a week.

Wash heavy stockings and underwear, whether all-wool or mixed, as though they were flannels—that is, in lukewarm borax soap-suds, with little rubbing, and no machine-wringing. Dry as quickly as possible, but in the air rather than by artificial heat. Shape on the line, so ironing will not be needed. Ironing, indeed, shrinks woollens nearly as much as washing, hence should be left off when possible.

Black-pepper tea will freshen the colour in both black and brown stockings. So will a washing in salt water before suds touch them. The salt bath need not be repeated after the first washing. But, whatever is used or let alone, remember always to shake stockings hard, turn them and shake again before wetting; also not to wash them in dirty or linty suds, after all the other things. Though they come properly toward the tag-end of wash-day, they fully deserve separate clean suds. Damp very lightly for ironing, and lay in shape before the iron.

Wet very dirty socks or stockings, as those of workmen or small boys, with kerosene, and let them lie half an hour. Then cover them with very hot water, made slick with either soda or ammonia, stir them rapidly around in it with a wooden paddle, fish out in a minute or so, and wash in clean suds. It will not be hard washing—most of the dirt will have been left behind. But beware of leaving them too long.

Some Small Helps

Ironing is, when all is said, tedious work, and trying. But it may be made less so by a few simple expedients. One is the floor-cushion before mentioned. Make a flat pad of excelsior, three inches thick, and big enough to stand comfortably upon. Another is the knee-board—three feet long, thin and light—which may be held on the lap, thus making it possible to sit while ironing small things such as napkins, handkerchiefs, and collars. Another—this for table-linen—is the roller. Get a big cardboard mailing-tube as long as a folded table-cloth is wide. Fasten a narrow ribbon inside the tube so a yard hangs out of each end. Then, when the freshly ironed cloth lies long and white, instead of folding it, roll it up about the tube, keeping it straight and smooth. Tie down the end with the ribbon, cross the strings, pass them around the roll, and tie on the other side. Thus the cloth keeps its unmarred smoothness, yet is easy to handle, and easier still to store in the closet.

Chapter *SIX*

Cleaning of China, Glass, and Metal

THE woman, "mistress of herself though china fall," is a rare personage. One at least among the fathers of the church laid it down as incontrovertible that a woman needed to be sustained by the grace of God as much when she broke a cherished plate as when she lost a cherished child—the difference was, she did not need quite so much of the grace in the first case as the last. Wherefore it is the part of pleasure, as well as of wisdom, to learn all that may be taught in regard to the care and keeping of treasures breakable and tarnishable.

Washing Glass

"If it were done, when it were done, then 'twere well 'twere done quickly," is the precept for washing all sorts of fine glass—cut-glass especially. Standing in water, no matter how clear, robs the cutting of lustre, and puts it almost on a level with pressed glass. Still, one must make haste slowly. Begin the haste some time before the beginning of washing. No matter if there is but a single bowl, wash it apart from everything else, and in perfectly clean water. If the bowl, or dish, or saucer is caked and sticky inside from standing after use, fill it

with blood-warm soda-water, and shake it vigorously for a minute, then repeat until the glass begins to show clear.

With any very fine or frangible glass, as cut-glass, cameo-glass, iridescent and Bohemian ware, especially pieces that have slender stems, or necks, or handles, set the pieces securely in a broad, shallow tray, covered with a double cloth, soft and clean, and place the tray upon the table at the right hand of the dish-pan. If the sink is some way off, set a basin for rinsings in front of the pan, and a pitcher of moderately hot water between the basin and the tray of soiled glass. An agate-ware pan not too small is best. Fold a soft, wide clean towel in four, and lay it at the bottom of the pan. Then pour in water, hot and cold. Half-a-gallon strictly boiling water to three quarts of cold gives about the right temperature. Put a tablespoonful of ammonia to the gallon. Use also a little white soap. Never let yellow soap touch glass of any sort—the resin in it makes a cloudy dull surface.

Put in the glass, a piece at a time; thus alone is one insured against chipping or cracking. Have a clean soft wash-cloth, also a very soft brush. Wash the glass quickly, using the brush on all the cutting, then pass it through a pan of rinsing water. The rinse-water needs to be a little hotter—one-half fully boiling, and the heat kept up by adding more boiling water from time to time. Do not keep the glass in it longer than a minute, wash it vigorously about, then turn upside down over the pan, and set, still upside down, upon a draining-board, covered, like the pan-bottoms, with a folded towel. Let it drain until the next piece is ready for the board, then take up and plunge in a deep box of fine sifted sawdust, either oak or white wood. No resinous or gummy wood gives dust fit to use. If the dust is hot, all the better. It should be kept in a clean bag, and hung over the stove, or laid inside a warm oven some little time before it is

wanted. After use, it must be dried, bagged, and put away for next time. The sort known as " jewellers' sawdust " is always safe. The best jewellers use it for drying fine metal-work after it is washed and polished. Take the glass out of the sawdust, brush with a very soft thick brush, and polish with a clean soft cloth. If there is no sawdust-box, wipe and polish after a few minutes' draining. Glass must by no means be allowed to get cold while damp. Use dry towels all the time—wiping with a wet towel is worse than no wiping. Do not use towels either conspicuously new or old. New ones are too hard and wiry to take up every bit of moisture; old ones shed lint, leaving their mark wherever they touch. The very best linen-crash, specially softened by several washings and bleachings, and kept solely for glass, is the thing to use.

Care of Decanters

To clean decanters and claret-jugs, if they are not finely cut, drop half-a-dozen buckshot inside, with half a pint of warm soda-water, and shake vigorously. If the decanters are much crusted, fill with soda-water to the stoppers, and let stand six hours. This will remove the crust, but must be followed by a little vinegar, shaken well around. Fragile, deeply cut bottles must be cleaned with alcohol and coarse brown paper. Cut half-a-dozen squares, three inches across, from the stiffest, roughest paper. Fold them lightly, and crowd them down the bottle-neck, then pour in half-a-cup of alcohol, put in the stopper and shake hard, holding the bottle sidewise, and shaking it round and round. Pour off the alcohol—it can be used again—fill with clear water, half-boiling heat, shake hard, let stand a few minutes, then shake and wash as directed.

If milk, cream, custard, ice-cream, or any of the fancy gelatine desserts, have been served in cut-glass, take par-

ticular pains that none goes into the washing-water. Rinse such things off first in cold water—poured in, shaken well round and emptied, then in blood-warm water, and in still a third water a little hotter, if the inner surface is cloudy or sticky. All the things enumerated, if once well washed into the fine lines of the cutting, are nearly impossible to get out, and, aside from their own dimming, gradually take to themselves other fine grimy particles until they half-destroy the beauty of the glass. In washing soda-rinsed pieces, take them up firmly, shake quickly, so as to set the soaking-water swirling, and empty it into the slop-basin or sink, taking care no drop goes into the pan. With hot-water faucets, and big generous sinks, there is a great temptation to wash all sorts of glass in the running stream. Resist it valiantly. Such washing invites disaster. It is wholly impossible to regulate the temperature of such a hot stream, and nothing is so apt to break a big costly piece of cut-glass as raising the temperature of one part a few degrees higher than that of another. The cost of one such piece will pay three times over for all the special appliances here directed.

How to Polish Glass

Once a year polish all sorts of fine glass this way: Sift some powdered French whiting through fine silk gauze, to make sure there shall be no coarse particles, put the siftings into a fresh gauze-bag, turn the glass, freshly washed, upside down upon a cloth-covered table, and dust it thickly with the whiting. When the last piece is dusted, begin on the first, and, with a soft clean cloth, rub the whiting off. In the cuttings brush it out with a very thick soft brush. Hold the glass with a cloth while brushing; never touch it with the bare hand in either wiping or polishing. Do not bear hard upon thin bubble-like pieces; they are almost sure to crush under a

heavy hand. As each piece is polished, wipe it all over with a perfectly clean cloth, and set away. In setting away, be sure no piece touches another at the side. Very small things, as nappies and salts, may be lightly piled, but those of any weight should stand separate.

Plain and Decorated Glass

Pressed glass is so cheap, so plenty, and so pretty, there is no excuse for even the humblest household's lacking a full supply. Thin tumblers, nappies, bowls, pitchers, water-sets, and so on, may have their usefulness prolonged if treated as directed for lamp-chimneys. (See Chapter on Lighting.) They need, further, to be well washed in hot soap-suds—not yellow soap-suds—rinsed, dried with clean soft towels, taking care to leave no lint, then to cool separately, and be set level in putting away. A glass or pitcher canted is almost certainly a glass or pitcher broken. Plain clear glass well kept is much handsomer than imitations of cut-glass. But, if one has a taste for the cut patterns, remember to wash them out with a stiff brush at least once a month; only thus is soap and dust removed from the deeps of the pattern. In patterns, those that are bold are better than elaborately fine ones. Use soda-water for the brushing out, and rinse after it until the glass does not feel slick. Dry with towels soft enough to crowd down into the crevices, and, once or twice a year, polish with sifted whiting, not dusted over, but rubbed on with a swab of absorbent cotton tied loosely in soft old silk.

Frosted glass needs especial care. The rough surface may easily become unsanitary, particularly if it is used for milk or porridge. Wash it weekly with a stiff brush, and either soda or ammonia in the water. Rinse and dry. Occasionally such glass is helped by putting it in cold water, so it is entirely covered, and bringing the water

gradually to a boil. A pitcher too small to have the hand go down inside should be well mopped out, taking care to scrub the whole interior surface. Clear glass is its own inspector, but that which is by nature clouded or coloured must be watched vigilantly.

Gilt glass, either Bohemian or imitation, must be very quickly washed in ammonia and water, dried gently, and polished sparingly. No matter how careful the handling, the gilt will wear more or less. Rare Venetian glass in gold and delicate colours should be washed inside with ammonia and water and a fine linen cloth, and cleaned outside with bits of the softest white silk, first with one dipped in alcohol, then rubbed with a dry one, and, after that, polished with a third cloth just touched with the finest sifted whiting.

Washing China

A big high-faucetted sink justifies rinsing well-scraped things in the running streams, but they should be washed in a roomy dish-pan three-parts full of hot suds. Rinsing under the faucets before washing, as well as after, keeps the dish-water proper, clean. Whenever it gets dirty enough to show floating cakes on top, empty it. Never rub soap of any sort, and especially scouring-soap, directly on patterned ware. Soap is particularly ruinous to gilt, and, though it does not greatly affect well-fired colours, it sticks so it is very hard to get off. Make the suds fairly strong, and add more soap as needed. A mop is best in some hands, a soft dish-cloth in others. Whatever is used in the washing, the most rigorous cleanliness cannot be too much insisted on. The great drawback to mop-use, indeed, is that it requires such nice care to keep mops wholly clean. Either mop or cloth needs to be well washed in clean hot soap-suds, rinsed, and hung to dry and air, after each using. Neither

should be used too long. The minute a cloth begins to fur, a mop to rag, throw it away.

The rinse-water should be something hotter than the washing-water, but beware passing china, or, indeed, any sort of ware from cool or even tepid water into hot, or *vice versa*. It may not break outright the first time, but it will lose something of temper, and soon show chips or cracked glaze. Cracked glaze has another root—piling hot plates or platters one in the other after wiping. Every piece should be allowed to get almost cool before another is set in it.

Few things are more hazardous, or more apt to ruin good ware, than rinsing with both hot and cold water running. Neither hot nor cold alone will do damage. It is the alternation that is perilous. Heat expands clay —very much less than metal, to be sure—but still enough to disturb the arrangement of particles. The faintest swelling underneath the glaze will destroy the surface. When glaze cracks badly, throw away the dish at once. Such cracks gather to themselves part of whatever goes in the dish, and hold it past washing away. But they do not hold these particles so firmly that hot liquids, or, more particularly, hot grease, may not seep in and force them out. Thus the dish may poison what was pre-eminently wholesome. Ptomaines come from stale animal and vegetable matter. A crack half an inch long may breed enough of them to kill a strong man.

Drain dishes well after rinsing, but do not let them dry. They will never feel clean. Neither will they feel clean if the rinse-water is so hot they dry themselves almost the moment they are out of it. Hot things can be wiped much easier than cold ones; they also feel and smell better. A perfectly washed piece of ware has no perceptible smell of dish-water. Such washing is impossible without a clean pan, good soap, plenty of water, and a great plenty of dry clean towels.

For washing egg-shell or other very fine china, put a folded towel in the bottom of the pan as directed for glass. The use of it is to save breakage, both in turning about or by accidental dropping. Put in only what the pan will hold comfortably; wash, rinse, drain, and wipe, working quickly. Do not leave fine china soaking in the water. Add fresh hot water as needed, or fill the pan anew. In clearing a table, take the things that are not greasy first, as cups, fruit, and cereal plates. All the glass must be washed before china, and set away to air and cool. Set away likewise the first washing of china before beginning upon greasy and heavy things.

As to Knives

Whoever has two sizes of knives needs also two sizes of knife-pitcher. A knife-pitcher is a tin vessel stout and squat, specially made and provided to save knife-handles from the wreck and ruin of hot dish-water. Any sort of knife-handle, from wood or horn to pearl and beaten gold, must be kept from soaking, if it is not to part company with its blade. The fact goes far to explain—almost, indeed, to justify—the prevalence of the so-called silver knives all in a piece, although they are among the heaviest and clumsiest bits of table-furnishing.

Gather up the knives early in the dish-washing fray, wipe off the blades with crumpled paper, then stand the bunch in a pitcher of proper height, pour very hot water over the blades—be sure not to pour it also over the handles—add a little soda-water, and let stand till everything else is done. Wash singly and quickly through clean suds, taking care that no dirt is left at the join of handle and blade. Rinse in lukewarm water, and dry while warm. This unless there are spots on blade or handle. Spots on ivory should be rubbed out with tripoli, mixed in sweet oil, and a clean flannel. Mother-

of-pearl seldom spots, but may be stained by fruit-juice or any acid running down from the blade. Wash very clean, then rub lightly and quickly with a little sifted whiting wet with alcohol. Wash clean after the rubbing, and, when dry, polish with dry whiting and a flannel or silk cloth.

To clean steel knife-blades easily and quickly, cut a good-sized potato in two, dip the cut surface in bath-brick or powdered rotten-stone, lay the knife-blade flat upon the table, and rub the spotted surface hard with the potato. In a minute at farthest it should be bright. Wipe dry, wash, dry again, and polish with a little dry bath-brick.

Silver knives stained with egg or vegetables are best cleaned by wetting, dipping in fine salt, and rubbing with a wet cloth. To polish such knives and keep them bright, rub them fortnightly with whiting, and afterward with a soft clean flannel. Use helps amazingly to keep such cutlery in the best order, but spare knives will take no harm if they are washed thoroughly, rubbed clean, wrapped separately in soft white paper, and put away in a tight box. Silver chests and leather cellarettes are handsome, and excellent things to have, but the plain tight box, dark and trig, is better for preventing tarnish than all their bedizenment of shaped trays and velvet rests.

Carving-knives and forks need to be very well washed, then to have a cloth over the point of a skewer run all round the join. If they have horn handles, the same skewer treatment should be applied to the horn ridges, or else the ridges should be washed out with ammonia and water and a very stiff brush—brushing with the grain of the horn. It goes without saying that carving-knives must be razor-edged. To insure that, first buy good steel, no matter what the mounting; then, once a year, have the blade properly ground. In between keep it sharp and true by help of a long whetstone such as is

used on mowing-scythes. It can be bought in any big hardware-store, should not cost over a quarter, and will last a lifetime.

Silver—Keeping and Cleaning

Big pieces of silver—as baskets, trays, loving-cups, centre-pieces—when not on show should have each its special Canton-flannel bag, made with the furry side in, and furnished with secure drawing-tapes at top. Put the vessel in the bag after cleaning it, draw the strings tight, then store in its case, if it has such a thing, otherwise upon its shelf in the plate-closet or safe. If there is fine chasing or hammered work outside, after the vessel is in the bag, pack jewellers' cotton securely all round it. In case of very fine work, too delicate to bear much cleaning, pack jewellers' cotton outside and in, then wrap well in paraffin-paper, twisting the ends securely, put in the bag, draw the strings tight, tie them, then tie the ends about the bag-mouth below the drawing. Gas—either sulphuretted hydrogen, or coal gas, or illuminating gas—is the most active agent in tarnishing silver, and such packing comes near to preventing gases of any sort from touching its surface.

Wash silver in hot suds made from good white soap, with a little ammonia added, and rinse in water as hot as the hand can bear. Wipe with clean dry towels. Change the towel as soon as it is damp. Wash all the silver at once, after glass and china are out of the way. When the last piece is wiped dry, begin on the first, and rub it quickly over with a wash-leather or piece of clean Canton flannel. This brightens it amazingly. Silver so treated every day will not require to be rubbed and polished oftener than once a year.

In washing silver lay aside tarnished bits for special treatment. Egg-stains are removable with wet salt, or

a paste of ammonia and whiting. The black marks which spoons gather from contact with certain green vegetables sometimes yield to a rubbing with alcohol. If they are obstinate, add a little whiting, and rub very hard. But in rubbing silver, especially small silver, take care not to bear so hard as to spoil the shape.

Never beat up anything, not even a single egg, with a silver spoon. Wooden, tin, and iron spoons are so cheap, it is vandalism of the first water to put silver to kitchen uses. Bear the same sort of conscience toward silver forks; they are out of place in dishing meat, pricking pies, or marking crust. Every kitchen should have its special steel forks for such purposes, just as it has special spoons. There should be china or triple-plated spoons of several sizes for measuring things like lemon-juice, tarragon, mustard, or onion-juice, which canker a tin or pewter spoon. Silver-plated things are, indeed, so cheap and good, they are almost indispensable in the kitchen. They should not be used too long; after the plating wears appreciably, throw them away.

Take a day for cleaning silver; if possible, a bright day, and work where there is a good natural light. Silver surfaces do not show true by artificial light; that is to say, one cannot always tell if canker and tarnish have come away leaving no mark. Clear off a roomy table, and cover the top of it with a thick cloth, folded. Wash the silver upon another table, using scalding-hot white soapsuds, with plenty of ammonia, rinsing in hotter water, and drying lightly with soft cloths. Set the pieces as wiped upon the rubbing-table in orderly array. Keep small things—forks, spoons, and so on—in sets. Count the sets as they are taken out; every case should be plainly marked outside with the number it holds, whether the set be full or broken. Keep cases and wrappings handy, so the cleaned silver may be promptly put away.

Provide at least a pint of thrice-sifted French whiting,

a bottle of alcohol, two clean brushes—one hard, one soft—jewellers' cotton, absorbent cotton, silk and flannel cloths in plenty, several pieces of wash-leather, and a small bottle of diluted oxalic acid. (See Chapter on Disinfectants.) Have in addition two or three shallow saucers, a small bag of net or gauze, and a bottle of sweet oil.

Begin with the smallest things, such as coffee-spoons and oyster-forks. Look them over for stains; if none are found, dip a flannel in a saucer of whiting, then in alcohol, and rub all the set quickly. Next rub them hard with a clean cloth, either silk or flannel, polish with a leather, and slip into the case. If there are stains, mix whiting well through the saucer of alcohol, cover the stain with the wet stuff, let it dry, then rub off and polish. If the stain is still visible, wet it quickly with oxalic acid, wash off almost instantly, and rub with whiting and alcohol. Wash again after the rubbing, and polish with a leather. Oxalic acid is a poison, so no trace of it must be left. If it takes off the stain, but leaves a dull mark behind, wet a flannel in sweet oil, sprinkle a little dry whiting over it, and rub the dull place hard. Then wipe with a clean cloth wet in alcohol, rub dry, and polish.

Go through the whole tale of spoons, forks, knives, pie, and sugar-shovels, and all sorts of silver tongs. Where there is much ornamental work, cover it with a paste of whiting and alcohol, let it dry on, then rub or brush off, and polish with a flannel and dry whiting, with a touch of leather at the last. Put everything away as it is cleaned, and be sure the numbers correspond with those taken out. When it comes to the big things, go over them one after the other with whiting and alcohol, mixed a little thicker than cream, covering every inch of visible surface, especially under handles and around knobs. Let the whiting dry; then with the stiff brush remove it from the chased work, and with the soft one from plain spaces. After the brushing, rub quickly rather than hard, turning

things round and round, so as to get over the whole surface in a short time. If any whiting sticks in the lines, let it dry a little longer, then brush very hard. Finish by rubbing with the merest suspicion of dry whiting dusted on through the gauze-bag, and removed with a flannel. Rub over smooth surfaces with a leather, but leave the patterns as they stand. This cleaning gives the "butler's finish," so much softer and more desirable than the glaring, staring span-new look.

Cleaning Brass and Iron

To clean brasses quickly and economically, rub them well with vinegar and salt, or oxalic acid and salt; wash immediately after the rubbing, and polish with tripoli and sweet oil. Unless the acid is washed off, the thing will tarnish so quickly, its last estate will be worse than its first. Copper kettles and sauce-pans, brass andirons, fenders, candlesticks, and trays, are best cleaned with vinegar and salt. Cooking vessels in constant use need only to be well washed afterward. Things for show—even pots and pans—need the oil-polishing, which gives a deep rich yellow lustre, good for six months. Oxalic acid and salt is the thing for furniture-brasses; if it touches the wood around it only improves the tone. Wipe the brasses well with a wet cloth, and polish thoroughly with oil and tripoli. Sometimes powdered rotten-stone does better than tripoli. Rub after using either with a dry cloth or leather, until there is no trace of oil. No matter what sort of brass is to be cleaned, it must first be freed completely from grease, caked dirt, and grime. Wash with strong ammonia-suds, rinse, and dry before beginning with the acid and salt.

The best treatment for wrought-iron or wrought-steel, which both have a knack of growing grey, lustreless, and ill-looking, is to first wash it very clean with a stiff brush

and ammonia soap-suds, rinse well, dry—by heat, if possible—then oil plentifully with sweet oil, and dust thickly with powdered quicklime. Let the lime stay on two days, then brush it off with a clean very stiff brush. Polish with a softer brush, and rub with cloths until the lustre comes out. This ought to give the colour of iron in daily use, which is nearly the most beautiful in the whole range of metals. By leaving the lime on, iron and steel may be kept from rust almost indefinitely.

Before wetting any sort of bric-a-brac, and especially bronzes, remove all the dust possible. The less dust water finds about fine lines and crannies, the less it can leave there. After dusting, wash well in strong white soap-suds and ammonia, rinse clean, polish with just a suspicion of oil and rotten-stone, and rub off afterward every trace of the oil. Never let acid touch a bronze surface, unless one wishes to eat and pit it for antique effects.

Mending Things

Broken glass, china, bric-a-brac, and picture-frames, not to name casts, require each a different cement—in fact, several different cements. Glass may be beautifully mended, to look at, but seldom so as to be safely used. For clear glass, the best cement is isinglass dissolved in gin. Put two ounces of isinglass in a clean wide-mouthed bottle, add half-a-pint of gin, and set in the sun until dissolved. Shake well every day, and before using strain through double lawn, squeezing very lightly.

Spread a white cloth over the mending-table, and supply it with plenty of clean linen-rags, strong rubber-bands, and narrow white tape, also a basin of tepid water and a clean soft towel. Wash the broken glass very clean, especially along the break, but take care not to chip it further. Wet both broken edges well with the glue,

using a camel's-hair pencil. Fit the break to a nicety, then slip on rubber-bands lengthwise, crosswise—every way they will hold. If they will not hold true, as upon a stemmed thing, a vase, or jug, or scent-bottle, string half-a-dozen bands of the same size and strength upon a bit of tape, and tie the tape about neck or base before beginning the gluing. After the parts are joined, slip another tape through the same bands, and tie it up above the fracture; thus, with all their strength, the bands pull the break together. The bands can be used thus on casts or china; in fact, to hold together anything mendable. In glass-mending, the greater the pressure the better, if only it stops short of the breaking-point. Properly made, the isinglass cement is as clear as water. When the pieces fit true one on the other, the break should be hardly visible, if the pressure has been great enough to force out the tiny air-bubbles, which otherwise refract the light, and make the line of cleavage distressingly apparent. Mended glass may be used to hold dry things, as rose-leaves, sachet, and violet-powder, even candies and fruits. But it will not bear to have any sort of liquid left standing in it, nor to be washed beyond a quick rinsing in tepid water. In wiping it always use a very soft towel, and pat the vessel dry, with due regard for its infirmities.

Mending Lamps: Mend a lamp loose in the collar with sifted plaster of Paris, mixed to a very soft paste with beaten white of egg. Have everything ready before wetting up the plaster, and work quickly so it may set in place. With several lamps to mend, wet only enough plaster for one at a time. It takes less than five minutes to set, and is utterly worthless if one tries working it over. Metal-work, apart from the glass, needs the soldering-iron. Dust the break well with powdered rosin, tie the parts firmly together, lay the stick of solder above the break, and fetch the iron down on it lightly

but firmly. When the solder cools, remove the melted rosin with a cloth dipped in alcohol.

A SAND-BOX: Since breakables have so malicious a knack of fracturing themselves in such fashion they cannot possibly stand upright, one needs a sand-box. It is only a box of handy size with eight inches of clean coarsish sand in the bottom. Along with it there should be some small leaden weights with rings cast in them, running from an ounce to a quarter-pound. Two of each weight are needed. In use, tapes are tied in the rings, and the pair of weights swung outside the edges of the box, so as to press in place the upper part of a broken thing to which the tapes have been fastened.

Set broken platters on edge in the sand-box, with the break up. The sand will hold them firm, and the broken bit can be slapped on. It is the same with plates and saucers. None of these commonly requires weighting. But very fine pieces, where an invisible seam is wanted, should be held firm until partly set, then have the pair of heaviest weights accurately balanced across the broken piece. The weights are also very useful to prop and stay top-heavy things, and balance them so they shall not get out of kilter. A cup broken in half, as is so common with cups, can have the tape passed around it, crossing inside the handle, then be set firmly in the sand, face down, and held by the hanging weights pulling one against the other.

The most durable cement for china is pure white lead, ground in linseed-oil, so thick it will barely spread smoothly with a knife. Given time enough to harden—some three months—it makes a seam practically indestructible. The objection to it is that it always shows in a staring white line. A better cement for fine china is white of egg and plaster. Sift the plaster three times, and tie a generous pinch of it loosely in mosquito-netting. Then beat the egg until it will stick to the platter. Have the broken edges very clean, cover both with the beaten

egg, dust well with the plaster, fit together at once, tie, using rubber-bands if possible, wrap loosely in very soft tissue-paper, and bury head and ears in the sand-box, taking care that the break lies so the weight of the sand will hold it together. Leave in the box twenty-four hours. After a week the superfluous plaster may be gently scraped away.

This answers for white and light-grounded wares. Deep coloured pieces had better be mended with gin and isinglass of double strength. Sometimes a little transparent colour, dissolved in alcohol, may be stirred through the cement with advantage. There are half-a-dozen cements on the market, each of which in competent hands will do fair work, but ware of their mending must be kept out of hot water—advertisements to the contrary notwithstanding.

Here lies the whole art and mystery of successful mending: Have the broken edges clean, be sure all the bits have been saved, know where each of them belongs before beginning work. Very tiny bits and splinters had better be cemented in place a day before the main work begins. If only one has all the pieces, by a little deft pains the most hopeless wreck may be made to look as good as new.

Beside the bowl of water and towel, keep a cup of clear turpentine and another of alcohol on the mending-table, also special rags for wiping the fingers. Never try to work with sticky fingers, nor persist in a mend that is on its face a failure. Better, far better, try all over again. Tepid water will remove any of the plaster cements, and alcohol or turpentine the others. Soak the broken bits until the cement is soft, then wash clean, and begin over.

Set broken casts in the sand-box, mend with egg and plaster mixed, and, when dry, go over the break with plaster and water about as thick as cream. Wash dusty or stained casts well in tepid soap-suds, and whiten them all over with plaster of the same thickness.

Chapter *SEVEN*

Keeping Things

BAD buying is the root of extravagance, but bad keeping turns the extravagance into waste little short of criminal. No matter how much money there may be, one should study to make the most and best of all it buys. The only way to do this is to take the very best care of everything from the time it comes to hand until it is consumed.

Meats—Salt and Fresh

The out-door fresh-air closet (see Chapter on Closets) is an excellent place to keep every sort of dry salt meat, as hams, bacon, sausage, dried beef, and smoked tongue. Fasten a stout board just below the closet roof, and screw into it half-a-dozen stout hooks. From these hang whatever is to be kept, but first wrap the meat in soft white paper, with black pepper sprinkled well over it, then slip it in a paper-bag, big enough and stout enough to hold without breaking. Tie the bag-mouth tight, but do not crumple the rest of it more than can be helped. Make a loop of the tie-string to go over the hook. In using the meat, after cutting slices, pack a bit of white water-proof grocers' paper over the cut surface, before it goes back into the bag. This prevents the escape of juice through the cut, and, further, saves the meat from growing strong, even rancid, along the cut.

Next to the fresh-air closet comes the upper part of

an airy cellar without furnace heat. If vegetable bins are in the cellar, hang the meat as far from them as possible. Further, put a wrapping of brown paper over the white inside the bag. All sorts of salt meat keep best in the dark—partly because there they are less subject to attack by insects, and partly because, in some mysterious fashion, strong light affects the flavour and solidity.

Keep pickled meats, as corned beef, salt pork, and salt fish, well down in the brine, under an opaque, well-weighted cover. Under the brine they keep sound and wholesome, but if even a corner is left standing above it, serious harm may come of it. If, accidentally, a piece of pickled meat is left thus exposed, either throw it away or cut off the part exposed. If the smell of pickled meat changes sensibly after beginning to use it, drain off the brine, boil it, skim it well, put in a double handful of extra salt, and pour back into the barrel boiling hot. If the smell is sour and offensive, take out meat as well as brine, wash it well in clear hot water, wash and scald the barrel, then rinse it lightly with clear lime-water (See Chapter on Disinfectants), pour out the lime-water, pack down the meat, and cover with boiling brine. But meat of good brands will nearly always keep, especially if put into a dry airy place, neither hot nor cold. Contrariwise, a furnace-cellar will spoil almost any sort of provisions not hermetically sealed. Even sealed ones are apt to suffer if placed where they are alternately very hot and very cold.

Indeed, it is distinctly unsanitary to keep much of the food supply in a cellar beneath the dwelling. Odours, exhalations, emanations, there will be in spite of the utmost precaution, the nicest care. Where cellarage is imperative, it is much better to have the cellar underneath a special building, say a laundry, either wholly detached or set off at one side or end of the kitchen. Such a cellar should be walled and ventilated wholly apart from the

dwelling. No pipes should run into or out of it, to connect with the main building, nor should the windows be so placed that air from them goes into the house.

In cold, or even cool weather, mutton, venison, and game can be hung in such a cellar for six weeks or two months. Fowls are best killed as wanted in hot weather or cold. Still, if bought killed in cold weather, they keep fairly for several days. This if they are undrawn, unplucked, and know not cold storage. Nothing from cold storage keeps well outside a regular refrigerator—nor in it very long.

Cuts of fresh meat, even steaks and chops, should be hung up rather than laid upon platters. The platter surface, or even a hard shelf surface, gathers some degree of moisture from the air, and with it the potentiality of taints. If meat is bought frozen, cook it as soon as possible. Thawing out even half-an-hour before cooking means loss of flavour and deterioration of texture.

People living southerly, where summers are long and hot and ice a costly luxury, may find in a dry well, or cistern properly cemented inside, a very present household help. A big cistern can have a step-ladder and shelves around the sides. But it is much easier and less costly to keep things at the ends of a rope, a stout unfrayed one, running over a pulley set higher than the head.

Fruit and Vegetables

A cellar, dark, dry, well ventilated, where the winter temperature never goes higher than forty degrees nor lower than thirty-three, is the best place to keep winter vegetables. Turnips, potatoes, carrots, beets, and parsnips can be stored there—preferably in barrels laid upon the side, after heading up, with holes in both heads and around the bung. Barrelled apples also keep well in such a place. It should not have bins; they give harbourage

to dirt smells and taints. A smell, it should be understood, is kindly nature's danger-signal of some condition that needs to be abated.

If fine fruit, such as winter pears or choice apples, must be kept in such a cellar, wrap separately in tissue-paper, and set so as to barely miss touching upon a ventilated shelf. This may be either of inch-wide hard-wood slats, nailed a quarter-inch apart, or thin hard-wood board, with quarter-inch holes bored thickly all over it. Such shelves should be movable. In summer, when the furnace is out of commission, they may be swung upon ropes hung from hooks in the ceiling of the main cellar, and used to hold fruit and fresh perishable things. Swing them one above another, in sets of three, say ten inches apart. After filling them, tie a wide cheese-cloth sheet, one big enough to surround the shelves, up to the ceiling hook, then fasten it so as to inclose the whole set. This keeps out flies, gnats, and dust, while not preventing free access of air.

Spread things such as green peas, string beans, spinach, and green vegetables generally, in a thin layer all over a shelf, first washing the vegetables very clean, and draining them fairly. Often one can buy from a huckster or market-man several days' supply for what one would otherwise pay for a single dish. Do not wet either cauliflower or young cabbage. Put them on the highest shelf, first tying down the outside leaves with soft string. Water-proof paper may be tucked lightly over the cauliflower curd, and save it from turning dark. Three hours before cooking heads thus kept, trim them, wash well, and put in cold water with just a suspicion of salt in it. If they are wilted, it will freshen them greatly. In a cool cellar, well covered and away from dust, cauliflower ought to keep a week, and cabbage two. Beans are unsafe after two or three days. Peas will keep a week, or, if they are of the big marrow-fat sorts and well filled, ten days. All

sorts of vegetables should be looked over every day, and those which show signs of mould or rot, removed, along with all those touching the mouldy spot. Once a week empty the shelves and wash well, finishing by a rinse with clear lime-water. (See Disinfectants.)

Give each sort of vegetable a separate shelf. Especially tomatoes. If frost find a crop of fully matured green tomatoes on the vines, they may be ripened through the next month, by plucking them carefully, each with an inch of stem, wrapping them in soft paper, and setting them separately upon cellar-shelves or upon trays—wooden trays—in a kitchen-closet. The warmer the place, the quicker the ripening. It must not, however, be too warm, or the tomatoes will rot very quickly.

Radishes, lettuce, and celery are all ill to keep. All three require moisture, yet will not bear lying in water beyond a few hours. Radishes will keep crisp for two or three days if they are tied carefully in bunches of a dozen, and hung so their tap-roots can touch water, then set in a cool place. Something the same treatment will keep lettuce in fair condition. Set the heads separately, roots down, in shallow cups three parts full of water, cover each head with a sheet of paraffin-paper, and tie the paper well down round the cup. Keep cool and, if light strikes the cups, turn them around daily. Celery will keep for a day or two if each root is wrapped separately in a moist clean cloth, then in a thick dry cloth, and set, stalks up, in a cool dark place—one just above the freezing-point is best.

Refrigerators

With a good refrigerator and plenty of ice, the problem of perishables is much simplified. Still, the best refrigerator has its limitations. Porcelain-lined refrigerators are far and away the best, but even porcelain-lined ones

need a deal of keeping clean if they are to be thoroughly satisfactory.

Do not set smelly cooked food in a refrigerator; that is, not unless the refrigerator can be given up to it. As few smells as possible is the first refrigerator commandment. The second is like unto it. Never let the refrigerator of itself breed a smell. This it will certainly do —an odour curiously compound of all imaginable staleness—if it is not most carefully kept. It needs to be scoured out every week, to be scalded after the scouring with boiling-hot soda-water, and after that with clear hot water, then to be dried, and left open to free airs for at least three hours.

The ice-chamber is for ice. Do not set dishes on it, nor pile it half full of raw things. Things in bottles securely corked, as milk, beer, and wine, will do no harm, but beware of breaking one. Beware, further, of the refrigerator which provides drinking-water from the melting ice. Such water is hardly fit even to throw away. Whatever is put round about the ice must be shielded from direct contact. Meat in particular is damaged by lying flat upon ice. It is a mistake to think it is safer next to the ice, unless there is a very insufficient supply. Cold air sinks—that is the thing which makes the refrigerator possible. Air properly, or, rather, sufficiently, chilled makes the chamber underneath the ice as cold as the upper division, with the advantage of being, further, perfectly dry.

In too many kitchens the refrigerator is turned into a sort of culinary savings-bank, or perhaps rag-bag is the better word. Any and all left-overs are popped into it and often left there, forgotten or overlooked, until they force themselves upon the attention by protesting smells.

Butter and Milk

Butter in the tub should be kept in the pantry, or the dry cold cellar, or out-door fresh-air closet. (See Chapter on Closets.) To use it daintily at table, and especially to keep it daintily, mould a pound or so at a time into square individual pats, wrap each pat in a square of water-proof paper, dipping the paper lightly in cold water before folding it over the butter. Pack these little pats down securely in a covered dish—glass or earthen-ware—and place the dish on ice, or in the fresh-air closet if the weather is cold. At meal-times take out a pat for each person, and, after unwrapping, lay them upon a bed of cracked ice in a deepish dish.

Milk keeps better, looks better, and tastes better from clean glass or fine thin china. Well-tinned new milk-pans and pails do no hurt; neither possibly does the market milk-can if it is kept properly clean and in good repair. But tin that has rubbed off, or got rough, or has rusty spots, will spoil the flavour and quality of the best milk ever strained. Milk will not keep unless properly cooled and kept from taints. (See Chapter on Four-Footed Friends.) If milk must be bought, try to get that which is bottled at the home dairy, and sold sealed under a guarantee.

Keep the bottles tightly closed. Further, do not open a bottle in a space of tainted air, as, for instance, a refrigerator half-full of cold vegetables. Take out the milk-bottle, close the refrigerator-door, and pour what milk is needed, then close the bottle tight, and set back. Of all food substances, milk is the easiest tainted. Meat comes next, and, after that, butter.

Mixing new milk with old is hurtful to both. Milk that has stood a day or two will turn to delightful clabber if poured into a bowl and left to stand in a warm kitchen.

After it turns, it can be cooled, and served with bread and butter, strewing sugar over the surface, or adding fresh fruit, mashed and sweetened. This makes a famous dish for a child's tea, especially in summer. Or the clabber may be turned into cottage-cheese by pouring it into a double cheese-cloth bag, salting and peppering it lightly, and hanging it to drain. Take down, work a little butter through the curd, along with more seasoning if needed, mould into balls, and serve with brown bread, or spread thin upon toasted crackers, sprinkle with minced olives, gherkins, or capers, and serve as sandwiches at five-o'clock tea or even lunch.

This same milk, mixed with twice its own bulk of fresher milk, would have soured the whole mass, or else given it a stale flavour. So a wise cook will proportion her milk requirements to the supply in hand—using more or less at each meal, according to what was used or left over from the one preceding.

Cream keeps longer and easier than milk. It is said that new untainted cream, hermetically sealed as soon as properly cool, will keep for at least two weeks without sterilizing. (See Four-Footed Friends.) But it must be kept even more carefully than milk from taints of every sort, also from light and alternations of temperature. Good, rich, pure cream, in clean air not warmer than forty degrees, should keep unsealed ten days if care is taken in the opening and closing the bottle. Every day put a fresh paper underneath the bottle-stopper, and wipe away all cream from the edge of the neck after each pouring out.

Canned Goods

As regards canned goods, the bubble reputation is a very real help. Packers who have achieved reputation are notoriously shy of sending out anything calculated to damage it—"swelled cans," for instance; that is to say,

cans so imperfectly sealed that their contents ferment and bulge the can noticeably. These swelled cans unscrupulous dealers prick to let out the gas, then reheat, and reseal. Such stuff always lacks flavour and nutrition even if it is not, as it may well be, unwholesome to a dangerous degree. Guard against buying it by looking well at the can-tops—taking, say, half-a-dozen at random from a case. If there is solder on a top anywhere but around the original ring of sealing, reject the goods, no matter what the brand.

Only the very best brands of green vegetables should be bought. Even the best are apt to have a trace of either salicylic acid or boracic acid, which, while not positively harmful in themselves, prevent digestion no less than fermentation. Cheap very green beans, peas, and so on are nearly always doctored with colour as well as preservative chemicals; hence are excellent things to let alone. Canned corn and canned tomatoes are generally safe, except in the case of swelled cans. There is some risk of lead-poisoning in very cheap tinned fruit, especially the more acid sorts, as peaches and plums. The fruit acid attacks the solder, also the very thin covering of tin on cheap tin-plate, and evolves from them various metallic salts, harmful to the stomach and by no means agreeable to the palate.

With canned things bought in quantity—which is a very considerable saving—keep the bulk of them upon the shelves of the cold cellar. Bring up cans the day before they are wanted, and always open them far enough ahead of time to let the contents air well. But never leave any sort of canned stuff in the can longer than a few minutes. Nine times in ten no harm might come of the leaving, yet the tenth time breed a poison. Prevention, which is so easy, is a million times better than cure. Airing canned things makes them taste and smell fresher, even those that are to be cooked. Always taste canned

stuff before seasoning, sweetening, or putting over the fire. Occasionally—very occasionally, it is true—there is a spoiled can, which, though it may look right, is far from tasting right. If there is an unnatural and somewhat unpleasant acid-bitter taste, do not try to neutralise it with soda, and disguise it with salt or sugar, but throw the can promptly away.

Nuts, Cheese, and Raisins

Nuts, cheese, and raisins all keep best in an airy place, neither dry nor damp, and wholly free of artificial heat. If a big cheese is cut, rub the cut surface well with good butter, then wrap it in a clean cloth, with paper outside, and set under cover upon a swinging shelf close to a window or ventilator. Keep fancy imported cheeses—Brie, Roquefort, Gorgonzola—well wrapped in tinfoil, with white paper over it, and under a glass cheese-cover. Leave raisins in their box, disturbing the layers as little as possible. Unless dried out, a box may last through a season, and the last cluster be as plump and tender as the first. Box-buying is very much cheaper than buying at retail. Indeed, where purse and pantry are big enough, all sorts of staple and fancy groceries should be bought thus in quantity.

A light barrel, with the hoops nailed fast, then sawed in two, and cut down further to leave handles upon the resultant tubs, makes the very best sort of nut-holder. Especially for native nuts—scaly-barks, black walnuts, hazel-nuts, chestnuts, pea-nuts. Half-inch boards, sawed half-way from top to bottom so as to interlock, and sloped at the ends to fit the barrel slant, will divide a single barrel into four compartments for as many different nuts. Bore holes in the wooden handles, so the half-barrels can be swung up out of reach of rats and mice. A few half-inch holes in the bottom will help to keep the

nuts sound and sweet. Spread a thin cloth over the bottom before putting in the nuts. It will keep tiny nuts from choking the holes, and thus insure air.

Finer nuts, as almonds, pecans, English walnuts, filberts, Brazil nuts, need exactly the same treatment. All the nut tribe will shrivel and grow rancid in too much heat, and become mouldy and rotten if kept too damp.

Keeping Eggs

Eggs are eggs—when they are not something else. The something else is most commonly what nobody wants to keep. On the surface, egg-keeping should be easy. It is, in fact, among the problems of preservation. Shells to the contrary notwithstanding, eggs take to themselves all sorts of taints. Nobody can dispute that who has wrestled with the athletic flavours of a limed egg, yet limed eggs are mild and mannerly beside some other sorts of eggs.

Egg-shells are porous; indeed, they have several inches of pores to each single shell. Otherwise, they could not hatch; the forming chick must have air as soon as it has life. Where air can go in, other things can also go. Water or its equivalent, moisture, can likewise come out. Thus, to be kept well, an egg must be saved from evaporation.

The best way to keep a superabundant egg-supply on to the times of scarcity is to either grease fresh eggs or varnish them lightly with water-glass—silicate of soda—then pack them down in cotton in shallow paper-boxes, only two layers in a box, and pile the boxes in a dry, airy, cool place. Turn them over every three days, to prevent settling. The cotton must be clean, and can be used over and over as long as it is kept so. If an egg spoils, and explodes, take out the whole boxful at once. Neither greasy nor varnished eggs will hatch unless the grease

or varnish is thoroughly washed off. It is said chicks have been hatched from eggs kept two years under varnish, with the varnish thus removed. Notwithstanding, setting eggs kept this way would be an exceedingly doubtful experiment.

Keeping Bread and Cake

Nothing baked can be well kept if it is not first well cooled. Things hot from the oven need to be set upon a soft folded cloth; any solid surface condenses the steam from them into water, and makes them heavy and sodden. Hence the importance of the bread-basket, with the doubled cloth inside. Hot loaves set to cool in it have the moisture taken up and dissipated as soon as it forms, thus leaving their crust crisp and appetising, and their crumb a light sponge.

Afterward comes the bread-jar, or the bread-box. Choose the box, if choice is possible—the box of well-japanned tin, with trig, tight-fitting hasped cover and sound hinges. Line it inside with a length of good linen-crash, wide enough to reach all across the bottom, and long enough to cover a boxful of loaves, with room to tuck in over the edges. Have a length of narrower crash for the ends, long enough to go under the other, and more than reach the top both ways. See that these cloths are changed weekly, also that the bread-box is wiped out with a wet cloth, and well dried. Monthly it should be scalded, using a little dissolved soda in the water. Dry the box thoroughly after the scalding, and set in the sun or on a hot stove for a few minutes. Keep the top up while it heats, else the last estate will be worse than the first. But take care not to let it touch red-hot iron, on pain of melting the solder and spoiling the box. Lay in the cooled loaves, upside down. A little air underneath will not hurt, for all the double crash. If there is old

bread, set it on top of the new baking, so it may not get hopelessly stale.

Toast surplus slices as soon as stale enough, and put away the toast in a clean tin-box. At need crisp the slices with a minute or so in the oven. Crumbs, both white and browned, should also be prepared thus as occasion serves, and kept always ready.

Pound-cake—indeed, all professedly light cakes—should be kept in a cake-box very similar to the bread-box. It is more sightly and picturesque if it is round rather than square, but should have the same sort of removable lining, no matter what its shape. Even more than bread, cake requires to be cooled on a porous surface. It will assuredly be sad if it is either allowed to cool in the pan or turned out on a platter, or even a hard shelf-surface. Eight-double damask is none too thick for a big cake, which will take at least three hours to cool properly.

Iced cake keeps longer than plain cake. All sorts of cake and bread stay fresh longer for keeping in a fresh-air closet. (See Closets.) In long-continued damp spells, or hot muggy weather, watch for the least sign of mould on cake, or, better still, prevent its appearance by heating the cake through, and letting it cool. Stale cake can be freshened by steaming an hour, then popping into a hot oven. But it is better to make it into some sort of pudding; there are several excellent ones for which stale cake is required.

Heavy cakes, fruit-cake, rich nut-cake, and raised cake, full of seed and spices, should be cooled before coming out of the pan. With fruit-cake, cover the pan with a towel, and on top of that a folded blanket. This to make the cooling very gradual, as it adds to the richness and flavour of the cake, and helps its ripening. Really fine fruit-cake should not be cut under a month from baking. It will be better for standing two months. It should be

kept in a clean earthen jar or crock, with a tight cover, and wrapped in a clean cloth wet with brandy. Once a week put a little more brandy on the cloth. Put nothing else in the fruit-cake jar, and do not frost the cake until after it is well ripened. Properly made, and kept cool, with renewals of the brandy cloth once a month after the first two months, real black fruit-cake will keep from New Year to Christmas, and be all the better for keeping.

Nut-cake and spice-cake also keep better in earthenware. If they are put in tin, open the box as rarely as possible, and keep the cloths inside tucked very snugly over the cake. Covering such cakes, also layer-cakes, well with water-proof paper with crumpled tissue-paper above it, keeps them fresh a good deal longer. Once a week everything in the cake-box ought to be lifted out, keeping the cake very closely covered the while, but wiping the box out, drying it well and airing it, and, if possible, sunning it, for ten minutes. Thus the heavy cake stays moist and rich, but mould and mildew are kept afar.

Sugar-cookies put, piping hot, into an earthen jar, lined with clean cloth, covered close, and kept covered twenty-four hours, will be much more crumbly and melting than if allowed to cool in air. The use of the cloth inside is to take up the steam, which might otherwise trickle down, and make sodden the lower layers.

Lard and Oil

Bright new clean tin, unmarred and well soldered, is the thing for keeping lard. Stone or earthenware absorbs more or less of grease. Besides, very hot lard may crack a stone-jar if it is poured rapidly into it; further, lard expands in freezing, the same as water, though not to the same degree. Where a year's supply of lard is put up at once, a sweet wooden barrel is not to be despised.

The trouble with barrels is to get them hot-grease tight. Liquid lard, like molasses, will creep out through cracks water would never penetrate. Lard in bulk should be kept cool, clean, and closely covered. Lay a clean cloth underneath the cover, and, when the cover is lifted, shake the cloth well so no dust can drop into the lard. With a barrel, it is better to take out a fortnight's supply in something smaller; for example, a special lard-bucket of pressed tin, with no seams to leak. Keep the barrel upon a platform three or four inches above the store-room floor. This lets air go underneath, and prevents rats from undermining to gnaw through the bottom.

Salad-oil is sensibly cheaper, and very generally better, if bought by the gallon from a reliable importer. True, there are such trade tricks as sending back over-sea cotton-seed oil labelled "pure olive-oil," but one is less apt to suffer from such practices at the hands of a big dealer than from one who sells only bottled goods. Keep oil bought thus in bulk, in demijohns, holding two to three gallons, and set the demijohns where it is darkish and cool.

Sugar, Salt, Spices, Flour, Soap

So much has already been said of keeping sugar, salt, spices, flour, and soap (see Chapters on Kitchens and Closets), it is hardly worth while to do more than mention them here. In a general way, all of them need the same treatment; that is, to be kept dry, clean, and in such fashion as to avoid waste.

Always empty a tin flour-can completely, and dust it out well before putting in a fresh supply. Twice a year at least wipe out the can with a cloth wet in clear boiling water, and dry it well, then let it air a while. In damp, muggy, mouldy weather put an asbestos mat upon top of a warm stove, and set the flour-can on the mat long

enough to heat and dry its contents without scorching. Keep the lid open while the warming goes on; thus the moisture driven away is not recondensed and made more harmful. Wooden flour-bins or buckets are liable to breed and harbour weevils. If one must perforce use wood, take care to empty, air, scour, and scald it at least every three months.

Soap, like wine, is the better for age. Wherefore buy it by the box. Borax soaps are milder than those made with soda and potash. But any good white soap, properly kept and managed, will do good work. Take out bars from their box, and pile them, cob-house fashion, in a light airy place. With a special laundry, a shelf above the stove is the place for soap, starch, and bluing, all of which need warmth, dryness, and light.

Syrups, Cereals, Dried Fruits

Keep syrups cool and dark, otherwise they are liable to grain a good deal. Glass is best to hold them. Next comes new tin. Earthenware sometimes gives a heavy taste, but will answer if jugs are new and clean. A jug used for wine or vinegar is unfit for syrup; almost infallibly the syrup will get a tang of the former contents.

Put dried fruit either into glass-jars or burlap-bags, and keep it dry and warm. Examine it frequently for worms; if they are found, scald the fruit two minutes, after picking out all the visibly wormy pieces, drain well, and dry in the oven. Insect depredations may be, in large measure, prevented by laying the dried-fruit bags upon a grating several inches above the range, or setting the jars containing it in a warm oven, for ten to twenty minutes about every fortnight.

Rice, cereals, and crackers all need to be kept as dry as possible. Warmth hurts none of them; thus they are best placed on high shelves. Put cereals bought in bulk

into double burlap-bags; it is stronger than cheese-cloth, yet admits air nearly as well. Crackers keep best in their original packages. If they are bought loose, store them in a tin or paper box, lined all inside with water-proof paper.

Preservative Chemicals—So-Called

Beware as of the plague the so-called "preserving powders" hawked about the country, particularly in the rural regions. Almost invariably they contain either salicylic acid, boracic acid, or formaldehyde—all good in their way, yet deleterious in food-stuffs. Witness the fact that New York City forbids their use by market-men, milk-men, and provision-dealers generally. None of them is poisonous, but all act by preventing natural changes in animal and vegetable substances. Hence they are ruinous to health and digestion. Depend on it that there is but one perfectly safe process for preserving fresh fruits and vegetables—to wit, namely, hermetic sealing in air-tight jars or cans. Animal substances are also thus preserved, and by salting and drying as well. Fruit and vegetables can also be dried, and remain wholesome if the process is quick and cleanly. Further, fruits can be conserved in sugar, and be not only wholesome, but delicious. Outside of these processes, preservatives are things it is very well to let alone.

Chapter *EIGHT*

Four-Footed Friends

EVERYBODY who has room enough, and money enough, ought to keep at least a horse and a cow. With a half-acre plot there is room a-plenty. It can be managed even upon a quarter-acre if the house itself is not over-big. Cost may be pretty much what one chooses. One American, at least, spent seven-hundred-odd thousand dollars in building and beautifying a stable to hold less than a dozen horses, yet it is questionable if he got as much pleasure out of it as simpler and luckier folk have got out of structures costing less than two hundred.

Unless the home's indwellers are all either invalids, very old, or lazy, or cowardly, keeping live stock need not entail keeping a man to look after them. If there is a hired man handy, so much the better. But anybody —man, woman, boy, or girl—can attend to a couple of animals, and thereby get a liberal education in patience, punctuality, kindly courtesy, and fore-thoughted care.

Pleasure wholly aside, horse-feed is cheaper than doctors' bills, to say nothing of being ever so much more satisfactory as an investment. A good cow well kept saves her first cost and feed-bill several times over in the course of a year. Further, there is the certainty of clean and wholesome milk, no small matter with growing children, or sickly ones, to be looked out for. Science says nowadays, after heaps of intricate figuring, that milk has a dietary value in proportion to cost beyond that of any

other food substance. More than that, it tells us how important it is to have exactly the right kind of milk. No other eatable thing is subject to so many chances and changes—pretty generally for the worse.

Three things are essential to pure milk—a healthy cow, a well-aired milking-place, and clean hands for the milking. Simple enough all, when there is but one cow to be looked after, but too often, and too wofully, conspicuous by absence in the dairies which supply the mass of human kind. Possibly the least objectionable dairyman yet evolved is the South American one, who drives his cow through the streets o' mornings, and milks the allotment for each household directly into its own pitcher. One would think that here, at least, adulteration was impossible. But, according to travellers, there are tricks in even the live-cow business. Commonly the milk-man makes treaty with the maids of all work, who rush out to him with pitchers a third full of water.

About Barns

About barns it is worse than idle to dogmatise. If the barn be already built, accept the ills the builder provides, and do all that is possible to minimise them. If building is in order, remember these things—to set the barn on firm dry ground as far as possible from the house, to give it a south face or an easterly one, and to let it stand as close as it well can to a lane, alley, or back street.

Accurate measurements cannot be given; in most cases they would be an impertinence. But where one wishes to accommodate a horse and a cow, a light trap, and maybe a saddle or two, this is a fairly good plan. Have a barn twelve feet long, nine feet wide, and twelve feet between eaves and floor, with a shed-stable eight feet wide down the sunniest side of it. It should be stoutly framed, and covered with upright sheathing, tongue-and-

grooved, and driven tight. If expense is an object, rough sheathing with two-inch strips over the seams answers very well. In severe climates the shed-walls had better be double, with building-paper in between, and also under the roof between the shingles and the ceiling. Give the roof a good pitch, thus it sheds storm-water and affords loft-space. Eight feet above ground put in a tight tongue-and-grooved floor, tight enough to save everything underneath from dust, hayseeds, etc. Make light sliding-doors in the shedded wall, directly over the stalls. Hay can be pitched down through these doors. The gable next the passage-way, whether lane or street or private drive, should have a big door for putting in hay, oats, or any sort of rough feed. Build a tight grain-bin in one corner of the loft. Narrow stairs should run up, inside the carriage-house, across the back. They need not be more than eighteen inches wide. Underneath them set stout smooth bar-racks for saddles, harness, and so on.

For the foundation, dig out the whole space to a depth of at least two feet, and fill in the excavation with eighteen inches of clean big gravel. Upon the gravel lay six inches of clean earth packed very hard. Lay upon this earth inside the carriage-house two coats of cement. In this way wheels are guarded against the equally fatal extremes of dryness and dampness. In the stable there are several ways. One is to leave the packed earthen surface bare; it is infinitely soothing and wholesome to the feet of stalled things. It needs whitewash once a month, and every three months to have two inches scraped from it, added to the compost heap, and replaced with fresh clean earth. But this requires space, trouble, and intelligent care. Wherefore in many cases—in most cases, indeed, it is better to cement the shed-floor as well, and set above it a floor of stout slats, nailed to supports back and front with half-inch interstices. Through this slatted

floor very much of soilure sifts. It is elastic—nearly as good for hoofs as the clean earth. Further, it can be lifted, the cemented surface swept clean, and whole stall washed out with the hose. With a slatted floor the cemented surface can slope more than would be advisable with an earthen one, thus insuring drainage. By making the outer cross-bar an inch or two thicker than the inner one, the slat-floor will still be level. Have the stall partition too high for interference, but open at the top to help in ventilation.

There ought to be a brick gutter, shallow but well cemented, at the back of the stalls with fall enough to take away the liquid-manure. Keep it free of litter, and flush it once a week with a strong solution of copperas, or else with carbolic soap-suds.

Put carbolic acid in the whitewash, which should be applied liberally to everything inside the stalls except the manger. Whitewash also semi-yearly the whole interior of the carriage-house. It helps to keep the air sweet and dry, and to banish mould and must; indeed, the whole army of bacteria.

Choice and Care of Carriages and Harness

Carriages should be chosen with an eye to the beasts that must draw them. The nearer level the draught, the greater the ease to team and driver. That is to say, high-wheeled vehicles require high horses. Moreover, nothing looks much worse than a pony-built cob pacing along with a rakish dog-cart at his heels, unless, indeed, it be a big long-stepping trotter hooked up to a low phaeton. Another point—the closer a vehicle is coupled, the lighter its draught. Length betwixt fore and hind wheels may mean ease to the riders, but is certainly very wearing on the team. In proof one has but to take the so-called

bicycle sulky, which has so lowered trotting-records. It puts the driver's weight almost over the horse rather than behind it.

Draught-power increases inversely to numbers; thus two horses can draw with ease four times the load that would tax either animal pulling separately. Still, if a single vehicle is properly constructed and proportioned to the conformation of the horse, it will hold a moderate-sized family without danger to the draught-beast. Always look for a carriage of such height that the main traction of the running-gear comes as nearly as possible even with the point of the horse's shoulder. Choose also, in a vehicle, the sound rather than the showy. A reputable maker's work is preferable—shops that needs must live up to themselves to live on are chary of sending out poor work; also of using unseasoned timber, flawy iron, and cheap gaudy paint. In vehicles, more than almost anything else, the best is, in the end, the cheapest. Repairs are costly—so costly that often a cheap trap's maintenance in running order for a year is double its original price. Beyond that, repairs have a knack of making haste slowly; the cheap trap is often out of commission at the very time it is most needed.

Staunch irons, sound wood, and good leather are but little hurt by getting caught in a storm. But they should never be left to stand in it—no vehicle ever built but will be ruined by such treatment. Once the wood is soaked it swells irresistibly. When it shrinks again, the join is loosened. Many wettings and dryings reduce the wheels to clattering nuisances, the whole outfit, indeed, to a rattle-trap. It is nearly as ruinous to leave a damp or muddy vehicle standing. The whole surface ought to be cleaned, and rubbed dry, then slightly oiled and rubbed again. Caked mud, hard and dry, marks varnished surfaces indelibly. Boiled linseed-oil mixed with half its own bulk of alcohol, and a very little turpentine, will keep panels

and running-gear bright and trig, to say nothing of saving more than half the wear.

In one corner of the carriage-house there should be a locker, with shallow shelves at the upper part. Keep in it wash-leathers for polishing, a soft scrubbing-brush, a blunt-edged wooden scraper, some big crash wash-cloths, a big bunch of clean cotton-waste, the polishing oil, bottled and tightly corked; another bottle, of strong soda-water; and a third, a very small one, of the best carriage-varnish. Hang a fibre-pail upon a handy hook, and see that it is emptied and rinsed after each using.

Keep also in the locker a fine-strawed whisk-broom for dusting cushions, and a sheet of stout unbleached muslin to cover the trap when not in use. Provide still other muslin-sheets to cover harness and saddle racks. A bottle of neat's-foot oil, filtered, and mixed with the least drop of alcohol, and some bits of flannel are also essential. A fine bristle harness-brush and a box of whiting will come in handy. Thus equipped, one can keep everything in good condition with a minimum of trouble.

To clean a muddy trap, remove all cakes and lumps with the scraper, then rub the spots hard while still damp with a crash cloth. Smear the mud as little as possible. Next half-fill the wash-bucket, put in enough dissolved soda to make it feel slightly slick, wash the spotted parts quickly, rinse with a cloth dipped in clear water, and rub dry. Then dip a bunch of cotton-waste in polishing oil, and rub very hard. But take care not to put the greasy waste back in the locker, or, indeed, in any confined space, as it is suspected of developing spontaneous combustion. Touch up scratches with the carriage-varnish.

Go over a dusty trap well with a clean cloth, wiping all crevices, and rubbing plain spaces. Brush the cushions, rug, etc., and turn them upside down. A weekly sunning helps them. It should not be longer than an hour, as the colours are apt to fade. Brush the top very well,

especially if it is of leather. If it is movable, straighten it out at least once a week, dust it well, and wipe with a slightly damp cloth. Twice a year it ought to be thus made taut, and then well rubbed over with the filtered neat's-foot oil.

Wheels in daily use need axle-grease at least once a week. To apply it, use one of the handy lever-jacks to lift the axle, unscrew the nut in the end of the hub with a square wrench, spin the wheel almost off, daub the axle liberally with the unguent, slip the wheel back in place, and replace the tap.

Harness whenever used should be scraped clean of sweat, mud, etc., and placed on the rack in such fashion that it cannot shape itself awry. Monthly it should be well washed in tepid soap-suds, dried quickly, then rubbed lightly over with neat's-foot oil. If collars are used, beat them up on the inside with a smallish round stick, so there may be neither lumps nor creases to make distressing collar-galls. Keep buckles, bridoons, and so on bright by occasional rubbings with whiting. In choosing harness it is well to avoid the showy sort unless one has a regular coachman. Jingling chains, linked rings, glittering rosettes upon head-stalls, gay red and blue pipings, and all the rest of it, need no end of care. The very finest harness has leather-covered buckles, and is made as plain as possible. Left the natural-leather colour, it is wonderfully smart with a trap of natural-coloured wood, oak or maple. Leather-coloured harness should be cleaned as directed, and dressed afterward, once or twice a year, with a special tan-dressing, such as is used for shoes.

How to Harness a Horse

Bridles need especial care. Keep the bits very clean, and see to it that they are smooth. The least roughness may mean a sore mouth, and consequent disablement to

the horse, to say nothing of untold suffering. In cold weather always warm bridle-bits before putting them in horses' mouths. Never drive on a curb-bit, nor a bar-snaffle. The plain snaffle gives ample control. Avoid also the over-head check. Indeed, any sort of check-rein upon a harness horse is a relic of barbarism that cannot be too strongly discountenanced.

In harnessing a horse, first bridle him, and make sure the head-stall fits—that it is neither so long the bit will drop against the teeth, nor so short the bit will cut the mouth at the corners. Next adjust the collar carefully, buckling it so it shall be neither tight nor loose. For light driving the breast-strap, or Dutch collar, is excellent, especially in hot weather. But with a heavy load, or where there is much work uphill, nothing can quite take the place of the soft full-padded collar. When sure it is properly adjusted, lift upon the right arm, breeching, crupper, saddle, girth, and hames, and lay them gently upon the horse's back a little way behind the withers. Fit the hames into their proper groove upon the outside of the collar, tie them fast, then move the saddle back the length of its strap, which should bring it to rest well over the horse's barrel. See that the saddle-pads press evenly either side the back-bone, also that there is not a hard or gritty particle upon them to gall the skin. Then drop the breeching around the animal's quarters, and slip the crupper deftly underneath its tail. Buckle in place, taking care it is not too tight. Next back the horse into the shafts, lifting them as he moves between, and slipping the ends of them through the shaft-stirrups swung either side the saddle. Snap the ends of the traces, which are fastened in front to the hames, over the buttons on the ends of the single tree. Wind the hold-back straps, in which the breeching ends, twice or thrice around the shafts, first slipping them in the catches or loops provided, and buckle them, taking care to leave them of

even length, also not to draw the horse up too short. It remains only to fasten the girth and put on the reins. The reins go first through upstanding rings upon the saddle, then are buckled into the rings either side the bit. The bridle-rein can either lie loose upon the neck, or go back into the check-holder. The check-holder is the best place for it, always provided that the rein is long enough to give the horse free use of his head in going uphill or down.

Double harnessing is almost the same thing. The main difference is that there are no holding-back straps, but instead of them breast-straps, running from the hames to the pole, and, further, in the setting on of the reins. Double reins have branched ends of unequal length. In putting them on, buckle the short end of each rein in the outside ring of a bit, and pass the long end into the inside ring of the other horse's bridle. Thus the two long ends cross equally, and insure that a pull upon either rein shall be felt by both draught beasts. In driving either a single or double team, hold the reins crossed in the left hand, palm upward. Thus the slightest wrist-motion serves to guide a well-bitted and light-mouthed animal. No other sort should be used for pleasure-driving. A beast that pulls on the bit, or is given to what horsemen call "boring"—that is, trying persistently to go to right or left rather than in a straight line—is one to get rid of, even though outside those tricks he may own half the virtues of the perfect horse.

Women, especially timid women, are sadly given to driving with a line in each hand. Nothing looks much worse, or is better calculated to ruin an animal's mouth. It cannot be too much insisted on that a horse's mouth is, in a state of nature, nearly as tender as a baby's. To jerk or drag upon it is a refinement of cruelty. The perfect driver sits straight, with the driving-hand low, and drives with the least possible exhibition of control.

Summing up, in carriages or harness it is ever so much better worth one's while to pay money for quality than for show; also to use the ounce of prevention in their care that will be found worth several tons of cure.

The Family Horse

Here, again, dogmatism is worse than impertinence. But at least it is worth while to set down several things the family horse should not be, or do. As to age, he should not be either young or old. Up to four years no animal's character is sufficiently formed to trust; after ten or twelve, the best and trustiest of them may grow cranky, crabbed, and full of ugly tricks. This is not to say the family friend who has grown into one's heart through years of comradry should be banished, but to impress possible horse-buyers with the value of seeking the Irishman's "middle extreme."

While thoroughbreds are in the main too high-strung for family service, a dash of blood is invaluable; it gives intelligence, beauty, health, and staying-power. A half-bred animal of good conformation will eat less by one-third than a cold-blood of the same inches, last longer, go further, faster, and keep in better condition, to say nothing of being ever so much more entertaining as a companion.

A hand, the standard of horse-measurement, is four inches. The best height for a general-purpose horse is fifteen or fifteen-and-a-half hands. Avoid an animal showing too much daylight below; also one long-waisted, or rather long-backed, with coarse, heavy legs and big splay feet. For driving, the squarer a horse trots the better. To judge the action, stand in front and watch the fore-feet. If they are thrown outward, with a half-circular motion, the beast is splay-footed, and will never be true-going. This, of course, unshod. Sometimes

improper shoeing causes a bad gait, which may be remedied entirely by properly balancing the feet.

A round symmetrical body, short back, sloping shoulders, and general snug, even, blocky build, are marks of a good and thriving animal. The neck should rise from the withers in a gentle slope. If there is a marked depression at the join, the beast is ewe-necked, and, though it may pull true and go well, is likely to be of a delicate constitution. A very long head, with a pronounced nose —"Roman nose" is the jockey's phrase for it—is not desirable. But in judging a beast, eyes and ears are the best indices of disposition. The eyes should be bright, full, but not too prominent, clear—no suspicion of film can be tolerated—the white clean, but only a little showing. Much white visible is a sure sign of viciousness. Indeed, there is no other single mark so infallibly indicative of the horse to let alone. Some farriers contend that age is shown by wrinkles in the eye-lid; that there will be a wrinkle for each year beyond six. This is, however, problematic. There can be no doubt as regards the ears. They should be wide apart, yet not low-set, over-big, nor drooping. Very small ears go usually with the white eyes, and, like them, indicate bad temper. Perfect ears are finely pointed, thin rather than thick, fairly open where they join the head, with the fore-top falling symmetrically between. Upon the road they are carried one forward, one back. Thus the beast hears both ways. If both are suddenly pricked forward, look out. The horse hears or sees something out of the common.

Persistent shying at small roadside objects is often a sign of bad eyes. Balking, kicking, biting, and cribbing are tricks taught by bad handling, and very hard to cure. If cured at all, it must be by courage and kindness. Right here let it be said that the person afraid of horses should never undertake to control them. Children should always be taught to have no fear of any sort of domestic

animals. Little ones, too young to have been taught fear, are nearly always safe in the company of four-footed things.

A pair of ponies can be kept in the room, and on the feed, of an average horse. A pair of donkeys are still more economical, both in cost and keep. For driving around villages or suburban places, the ponies or donkeys are admirable. Still, for real drives cross-country, or for loafing about summer lanes, nothing matches the well-fed, well-groomed, well-conditioned animal strong enough to take a light trap and three or four people up hill, down dell, the best part of the day. Often among cross-bred trotters one finds nearly ideal animals. Hackney blood also makes showy and serviceable beasts. All these may be had for a moderate price. But beware of anything which is the product of several separate strains, as the hackney with the cross-bred trotter, or the trotter with an infusion of the heavy Percheron. However sightly such beasts appear in the sales-ring, they are nearly always hard to handle and worse to keep; soft, unreliable, what horsemen call "washy," and given to all the ills horse-flesh is heir to.

Care of a Horse

The care of a horse is very simple. He needs to be curried whenever he has been driven or ridden to a sweat, brushed afterward, then well rubbed down. Standing in stall he should be brushed every day, and curried twice a week. At all times he ought to be well bedded, with clean dry litter, either leaves, bright straw, or fine soft shavings. Coarse, damp litter is unwholesome. The bedding ought to be renewed every seven or ten days. Throw the old bedding in the compost heap, which is a necessary adjunct of even the smallest stable. Clean the stall daily. Take up the bedding upon a two-tined fork,

shake all manure out of it, and throw it in a compact heap at the back of the stall. Shovel up the droppings, then sweep the floor well with a hickory broom, first sprinkling it well with either copperas-water or dilute carbolic acid. Monthly scour the manger and drinking-trough with hot carbolic soap-suds. A stall thus kept will be almost odourless, and wholly sanitary.

A horse that comes in reeking hot should not stand still to cool. Instead, walk him about, gradually slackening speed. Never feed a horse until thoroughly cooled, nor give more than a swallow of water when he comes thirsty to the trough. Let the swallow be a full one; then pull up his head, and make him wait a minute or two. Thus he is saved from a host of stomach ills. Feed with sound whole grain, either corn or oats. Oats and bright hay, or sound corn-fodder, make up an ideal ration. Give only what grain will be eaten clean. With a hard drive in prospect, give extra feed a day or two beforehand, but a sparing meal when on the point of setting out. Water after the morning feed, and before and after the mid-day one. If the grain is ground, it is better either made into mashes, by mixing with hot water and a little salt, or sprinkled over well-cut hay that has been made fairly damp.

Even an hour at grass every week in summer helps a horse wonderfully. Every day, of course, is better. In winter two or three carrots, or as many apples, with the noon feed are much better than medicine to keep him healthy. Sugar is best given sparingly, as a sort of reward of merit. Keep a lump of rock-salt in an open-work iron salt-box hanging in the stall, where it can be licked at pleasure. Upon woodland excursions it pays to cut longish straight sticks of young oak, dog-wood, and poplar. Lay one of these across the manger after feeding is done, and see how avidly the horse will peel off and devour the bark. It is nature's tonic, and will soon show

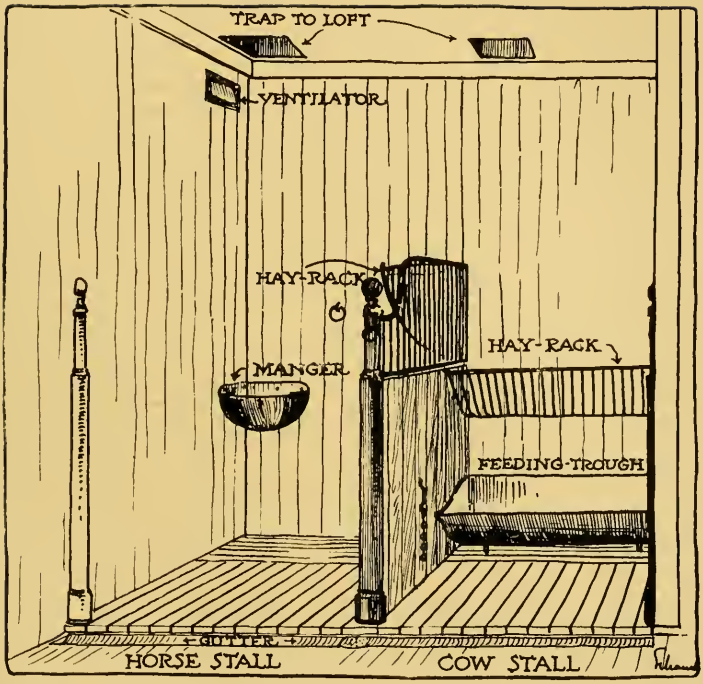
its virtues in shining coat, clear eyes, and increased strength and speed.

Standing in stall is more wearing than the hardest sort of use. Wherefore give a horse exercise every day. Twice a day is better. Walking exercise at first, quickening gradually to a gentle run. This saves health and temper. The best horse in the world is unsafe, madly rebellious, after standing a week, cabined, cribbed, confined.

Stalls and Fittings

With a big horse, or pair of ponies, and a small cow, divide the shed unequally—five feet for the cow, seven for the team. With average animals, six-foot stalls are better. With walls and partitions of sheathing, ventilation will almost take care of itself; still, it is well to have square-grated ventilators in each end of the shed, and, additionally, a two-light sash, with a wooden-grating outside, set so as to slide, in the outer shed-wall opposite each stall. Thus the light comes over the animal's shoulders, instead of streaming in their eyes. The windows ought to be just under the eaves, out of danger from the wildest kicks. In summer leave them open, but cover the grating with cheese-cloth or burlaps, to exclude light, and with it the tormenting flies.

Set the horse's manger according to his height; he should be able to eat from it with his neck held level. Do not halter him in stall unless very unruly; still, it is well to have a big ring stoutly fastened to the wall, several feet above the manger, for a running halter, long enough to permit lying down. It must not be too long; there is the danger of getting a foot over it, and casting himself in rising, to be guarded against. In a double stall have two halter-rings; then the occupants can be so tethered the greedy fellow cannot whip away and rob the other of his feed.


TRAP TO LOFT
VENTILATOR
HAY-RACK
MANGER
HAY-RACK
FEEDING-TROUGH
GUTTER
HORSE STALL
COW STALL

With running water, an iron drinking-fountain is handy. Theoretically it saves trouble. Practically it often makes more. In cold weather it is apt to get full of ice. A brick cistern either under or above ground, well cemented, and supplied with rain-water, is the very best and most wholesome source of stable-water. Animals prefer soft water to hard, and thrive much better upon it. Besides, such cistern-water is almost always of the right temperature.

Feed a cow upon a platform or little raised floor of a height to let her eat with her head well down, but without spreading her fore-legs, as in grazing. The platform is for rough food—hay, corn-stalks, and ensilage. Water and grain should be given in buckets, which can be removed and well washed between times.

Tying up often saves a cow from fouling her udder. Put an easy leather-collar around her neck, with a snap-hook at one side of it to hold a ring in the end of a light chain running to the stanchions either side the feeding floor. Give her chain enough for easy movement, but not enough to permit turning about.

The Family Cow

The family cow is a general-purpose animal which can be depended on for milk ten months out of twelve, and, when past milking-age, have some attraction for the butcher. Hence it goes without saying she is not any of the fancy full-blooded beasts. Among the full-bloods a Jersey with an American pedigree running back forty years is unquestionably the best. If one has a ready market for cream, such a cow well kept may pay all her own expenses, yet furnish a surplus of cream for family use. The milk, however, is not so good for children or delicate people as that of grade animals—that is, pure blood, either Jersey, Ayrshire, Devon, or milking Short Horn,

crossed upon good native milking-stock. Holstein cows give enormous milk-yields, but are so big and ungainly they are not suited to private or, rather, amateur keeping. The drawback to the Jersey strain, even the American Jersey, is that the dry cows do not bring much when they go to the shambles.

Whatever the breed—whether any or none—the cow herself is the thing. Choose a beast with a fine lean head, lightish fore-quarters, a wedge-shaped body, and legs rather short than long. She ought to stand an inch higher at hips than withers, and hold her hind legs well apart. Long horns are undesirable. They should be black at the tips, of a creamy or, rather, waxy texture elsewhere, and curve gently inward. Eyes, bright, clear, and full open; ears thin and flexible; coat, loose on the frame, mellow; the hair fine to the touch, the skin showing yellow underneath when the hair is parted.

Udder-size is often deceptive. There are fleshy udders, and others that shrivel and crumple like a kid-glove. Choose the kid-glove ones, and have the quality proved by clean milking. Teats too big to be well grasped give no end of trouble; they are apt to be bruised in milking. Too small, they are still troublesome, as they cramp the hand, and thus prevent clean milking. The perfect udder is generous in size, well let down to the teats, of fine smooth skin, with scattered silky hairs upon the upper part. The main colour should be white, though a blotch of coat-colour at one side is not bad. But any roughness or excoriation is a cause of suspicion. So is the least caking or lumpiness after milking. Big milk-veins are thought to indicate a generous flow; still, they have been lacking in some queens of the pail.

The family cow should not weigh above a thousand pounds. Eight hundred, or even seven, is in most cases better. Well cared for, with a month-old calf, a good milker should give something more than her own live

weight in milk each month, for six months. After that the amount lessens, though there is about the same quantity of cream and potentially of butter.

Feeding the Cow

Whole grain is the most wasteful sort of cow-feed. Use ground stuffs, as oats and corn, pea and corn-meal, wheat-bran or middlings, with a little oil-meal. Cook it well, to a sort of soft mush, and feed milk-warm even in summer weather. From October to April warm the water for drinking; a cold pailful may cost a quart of milk next milking. In addition, give plenty of rough food—hay, corn-stalks, straw, ensilage, pea-stalks, and so on. Whatever is fed must be sound. Any sort of mouldy or strong substance will taint and ruin the milk, besides hurting the animal's stomach. So long as a cow thrives and does not lay on flesh, she cannot be over-fed. This, of course, at steady feeds. Like any other beast, she is in danger of surfeit if given too much at once.

Apples, if sound and sweet, are as good for a cow as a horse. Carrots also may be fed, but sparingly; so may sugar-beets, but turnips are barred by tainting the milk. All manner of bread-scraps may be cooked up in the food. Occasional cabbage-leaves are much relished, but beware of too many. Put a little salt in the cooked messes, and sprinkle the roughness with salt water. In addition keep rock-salt, as for the horse. Where salt is always at hand, an animal is in no danger of getting too much.

Keep a cow always well bedded, and clean the stall carefully. Curry and card the coat well every day. Do the work thoroughly but gently. The cow will soon grow to love it. In a state of nature her tongue is a combination of brush and card, her teeth her curry-comb. Renew her bedding as often as it grows dirty, and occasionally, after currying, wash the udder and hind quarters

well with tepid soap-suds, and rub dry. Give gentle exercise every day. In summer, if it is any way possible, tether the cow at grass soon after the morning milking, and take her back to stall before the heat of the day. If there is no pasture handy, at least let her out in the air for some hours each day.

Milking and Milk-Pails

If the milking must be done in stall, sprinkle the floor of it well before beginning, and once or twice a week put a lump of copperas in the sprinkler. Wash the whole udder very well, and wipe it dry, then wash hands, and put on a special milking-garment, like a child's long apron, with elbow-sleeves. Tie a clean cloth over the hair. It has been found at the experiment stations that more than fifty per cent. of milk impurities get into it before it is ever strained, either from the milker, the cow herself, or the air of the milking-place.

Milk-vessels of pressed tin are far and away the best; they are light, cheap, and have no seams to catch dirt. Only an expert can milk with both hands, and thus need the big pail set between the cow's feet. It is better to use a quart-cup, and milk with one hand, changing the hand as the muscles tire. Milking is one of the few things easier done than said. Not that as work it is easy, but one may do it more readily than tell how it ought to be done. Use the cow gently, talking to her kindly at the beginning, and showing patience with her occasional vagaries. As soon as the cup is three parts full, empty it in the bucket, which should stand on a shelf outside, and have a hemmed circular-cover of cheese-cloth, with a heavy wire run in the hem. Warm milk must not be covered close for even a little while; it spoils both the taste and the keeping quality.

Care of Milk and Milk-Vessels

Nothing else in the world takes an alien taint so readily and so disastrously as fresh milk. Never let it go into a cellar, or any place that is not airy, dry, and sweet. Take it out of the stall's neighbourhood the minute milking is done. In straining it, suspend the strainer at least two feet from the top of the crock, and pour in the milk in a slow, steady stream. Aeration takes away the animal heat and odour. If cool milk is wanted at once, pour a sufficient amount of the strained milk into a very shallow pan, and set the pan, covered with cheese-cloth, upon a block of ice. The milk should not be more than an inch deep in it, and will be cool in ten minutes.

Do not put ice in milk. Aside from the chance of contamination, it somehow changes the nutritive values. Where milk must be kept ice-cold, as in a sick-room, set the vessel containing it in water with plenty of ice, and place in the milk itself a wide-mouthed bottle very carefully washed, and filled with cracked ice.

New milk, put while warm into a refrigerator, gets a disagreeable taste, and quickly taints everything else. It is not safe to put away milk anywhere until it has lost animal heat, nor even to scald it for cream, nor to sterilise it. In scalding, fill bright tin-pans two-thirds full, set them upon the stove, and let them heat very gradually, but not to boiling-point. About a hundred and fifty degrees is right. The cream comes quicker for scalding, and stays sweet longer, but is not so good for delicate cookery, though it makes fine butter.

With one cow it is better to churn all the milk than to keep cream over until a churning accumulates. Unskimmed milk makes the only buttermilk really worth the name, a delicious and nourishing drink, and almost invaluable in cookery. Have two big stone-crocks of four or five-gallons capacity, with hard-wood top and dasher

that will fit both. Put the surplus of morning milk into one of them after it is well cooled, cover with either a cheese-cloth or wire-gauze cover, and let stand in a cool place. Just before bed-time add the night's milk, which has been well cooled and strained. By morning in summer-time the whole mass should be clabbered and ready for churning. Scald top and dasher in boiling water, cool them, put them on, and begin to churn. If the milk foams, add a very little boiling water, churning hard as it goes in. In twenty minutes the butter ought to come. Take off the top, pour in a little cold water, gather the butter on the dasher, and lift it out into a bowl of cold water. The water poured in the churn will not hurt the buttermilk, as it will rise to the top, and can be poured off. Use the two crock-churns alternately, sunning the empty one, after washing and scalding well.

Winter cream can be skimmed, and kept until a churning accumulates. Without a regular dairy, it is hard to keep it sweet and wholesome. It is one of milk's idiosyncrasies to take up every smell and taste that reaches it when uncovered, and to develop worse smells and tastes on its own account, if kept covered too close. Cream keeps fairly well in cold weather if put in a sweet earthen crock, and covered with a coarse, loosely woven cloth. If it can be kept safe outside, away from bad air, the butter will be all the better.

Separators

All that has been written of hand methods is meant for the keeper of a single cow. With three or more good milkers, it pays to give one's self the help of modern machinery. Hand-separators range in price from $65 to $125, according to capacity. The smallest size skims one hundred and sixty pounds of milk in an hour, the largest, four hundred. All but the very smallest have

attachments for other than hand-power. A gasolene engine, a dog, a goat, even a donkey, on a tread-wheel may do the work excellently, but with a machine properly geared it will not over-tax the strength of a reasonably well-muscled man or woman.

A separator handling the milk of five cows will, it is estimated, pay for itself in the course of a year by the extra amount of cream. Properly handled, it leaves less than one-tenth per cent. of butter-fat in the milk. Hand-skimming, even when carefully done, leaves almost ten times as much. A further benefit is that, since the milk goes straight from pail to separator, the skim-milk can be fed to calves, pigs, or any young animal while fresh and sweet, and without warming. It is thus ever so much more wholesome than when beginning to sour. All that has been said of the care of milk-pails, strainers, and vessels generally applies with double force to the separator.

Since the milk goes into it warm, the separated cream must be cooled and well aired as quickly as possible. The simplest way is to pour it in a small stream from one can into another set at least three feet lower, and repeat the process several times. A better way is to have a cream-cooler, shaped like a large colander, but with many very tiny holes all over the bottom. Set the cooler high above the can in a cool, clean, airy place. All milk-products taint so easily, the least ill-odour may mean serious loss, or possible danger. Well-cooled cream keeps excellently at a temperature anywhere between forty and fifty degrees, It is important to have the temperature uniform. Fresh running water around the cans is always desirable. Unless the cream from each milking can be kept to itself, stir up the cans thoroughly whenever fresh cream is put in. Twelve hours before churning, set the cream where the temperature will rise to seventy, adding a little sour cream, unskimmed sour milk, or even buttermilk, to start the souring.

With a separator some form of revolving churn is almost a necessity. Either the box or barrel shape answers—the main point is to have no inside fixtures, impossible to keep clean. Bring the cream to the right temperature, about sixty degrees, by setting it in hot or cold water as needed, before it goes into the churn. Turn the churn slowly for a minute, increasing gradually until it revolves very fast. Do not churn too long. Here experience alone must be the guide. There is a peculiar sound of the milk which lets one know when the butter has, in dairy parlance, "come." As soon as the butter-granules are the size of wheat-kernels, stop churning, throw in a little salt, and give the churn a few more whirls. Draw off the buttermilk through a hair-sieve so as to save all the butter-granules. Then put into the churn clean cold water, enough to cover the butter and set it floating. Draw off this water, and wash the butter again. Let neither wash-water stay too long in the churn upon pain of destroying the butter's finest aroma.

To sterilise milk, strain cool new milk into a deep vessel, set the vessel in cold water, and let it stand six hours. Now pour off the upper half of the milk; the cream will have risen in it, making it extra rich. Fill clean, thick glass-bottles two-thirds full of this top-milk, stop their mouths with wisps of absorbent cotton, and set them in a biggish kettle, upon an inverted tin pie-plate driven full of holes. Fill the kettle until the water in it stands a little higher than the milk in the bottles, keep it at that height, and simmer for three hours. Six hours is better in hot weather. Let the bottles cool in the water. Keep them in a cool place, but not in contact with ice. If left unopened, the milk in them will keep sweet for a long time—a month in cold weather and a week in hot. But once the cotton is removed, the milk must be used quickly, as it absorbs from the air a new supply of bacteria to take the place of those killed by the boiling.

Care of Milk-Vessels

Milk-vessels cannot possibly be scoured too much, but may well have too much soap used in the scouring. Soap, indeed, is somewhat out of place in dairy work. Instead use washing-soda, borax, boracic acid, and clean white sand. Wash anything milky first in cold water, never more than tepid. Hot water cooks and cakes the milk, and soap changes it to a slimy emulsion. Remove the milk thoroughly; then, to take away the greasy residue, wash and scrub well in water as hot as can be borne, with plenty of soda in it; then rinse in clear hot water, and dry with a clean towel. Once a week scald out everything with a strong solution of borax, after the washing and rinsing. Let the borax-water stand in the vessels till cold, then rinse in hot water, dry, and air.

Use boracic acid in solution to rinse out milk-bottles, double-boilers, milk-bowls, feeding-bottles, and so on. It is also excellent for dairy towels and strainer-cloths. They should first be well washed with borax-soap, boiled, and wrung out. Cover them with the boracic-acid solution, let stand five minutes, then rinse as usual. It is possibly worth while to explain that, after many inventions, the best strainer for the private dairy has been found to be the tin-basin, open at bottom, with a double rim—the movable outer one for holding on the knitted cotton strainer-cloth, that is removed and washed after using.

A Little Cow Sense

A cow is simply a vitalised machine for turning vegetable food into milk and cream. That is one view of it—the commercial one. To run this machine profitably, she must be well fed and well milked. Unless she is milked clean each time, she will go back, in spite of the most generous feeding, and begin to put on flesh. Contrari-

wise, the most faithful milking, the most conscientious milk-secretion on her part, will not give a good flow unless she has wherewithal to evolve it from. Watery feed makes much milk and little cream. Dry feed, rich in fat, gives much cream proportionately, but little milk. In cow-keeping, more than almost anything else, with what measure ye mete, it shall be measured unto you again.

Good, wholesome milk comes from the udder in brisk whitish streams. If it is bloody, or yellow, or clotted, it is unfit for use. Do not save the milk for food until the calf is nine days old. Two weeks old is better, or even a month, if the cow does not seem to thrive. A cow has, and is entitled to have, her idiosyncrasies. If she shows a special antipathy to a place, person, or sort of food, accept the fact at face-value; be sure there is a sufficient reason for it in her cowish mind. Antipathy to a milker may be sometimes overcome by steady kindness. If it persists, it is well to change either the milker or the cow. Similarly, a special fondness may be humoured. A cow with liberty to choose her own milker is apt to make returns for the liberty in banner yields at the pail.

The Compost Heap

Stable space predicates a bit of lawn and garden, or, at the very least, a plot of turf. Therefore make a compost heap. To do it handily, one needs a very light wheelbarrow and a box of either road-dust or sawdust, kept bone-dry. Stable-cleaning necessitates a fork and shovel. When the litter has been shaken and the manure swept up, or shovelled up, throw two or three spadefuls of the dust in the bottom of the wheelbarrow, then pile manure upon it, and take it to the heap. This should be under cover for the best results, but may be simply a corner of the inclosure. Lay down a floor of loose old boards, pile the barrowfuls upon it, heaping them slightly, and spread-

ing them evenly, and cover as spread with either fresh clean earth or layers of road-side turf. If turf, turn it upside down; thus the fibres decay quicker. If upon wash-days the compost is soaked with the dirtiest suds, its fertilising value is almost doubled. Two well-fed animals will furnish manure enough to make a fair-sized garden enormously rich, and leave something over for the grass. Always keep an upper layer of earth or sods. Otherwise the ammonia, the most valuable element, will escape into the air.

Sick Animals

Care, cleanliness, and kindness are the best possible medicine for animals of every sort. That is another way of saying that prevention is many million times better than cure for all sorts of animal ills. In the nature of things, diagnosis of such ills is more or less a matter of guess-work. With a valuable animal, lose no time in calling in the veterinary surgeon upon the first sign of serious sickness. But since competent vets are not always, nor generally, within reach, it may be worth while to tell something of diseases, and remedies for them, which it is possible for any intelligent person to use.

Colic, which may be caused by improper feeding, sudden cold, or eating, or over-drinking while very hot, is distressing and dangerous, also in aggravated attacks so quickly fatal, it demands to be treated in time. A horse suffering from it rolls violently, gets up, flings himself down, rolls, stretching all four legs straight and stiff afterward, and motions with his head toward the seat of pain. If the case is serious, he begins to swell. Whenever that happens, there is no time to lose. Bridle the animal, throw the reins over something higher than his head, and pull on them till his muzzle comes above his gullet. . In this position drench him. For the violent

swelling that indicates spasmodic colic, give a tablespoonful of chloroform in a pint of sweet milk. Put the drench in a long-necked bottle, force the bottle-neck in the animal's mouth, and pour its contents down his throat. If he refuses to swallow, keep his head up, and gently stroke the gullet. In a little while the liquid will go down. It is safe to calculate that half the drench will go to waste, and allow for that in its proportioning. Another good drench is turpentine and lard. Melt a pound of lard, just so it will run freely, and stir well through it a tablespoonful of turpentine. Warm the drench-bottle before putting in the lard. If there is no improvement within half-an-hour, drench again. Spring colic, caused by getting overheated in the first days of work, may usually be relieved with a drench of sweet milk and Irish potato. Peel a sound potato as big as the fist, grate it into the milk —the fresher the milk the better—and drench at once. Repeat within an hour if needed. After the first drenching, put a light boy upon the animal and let him ride it steadily at a brisk trot, resisting its efforts to lie down and roll. The great danger in colic is from intestinal obstruction, and motion helps to discharge the accumulation of gas.

Botts, or grubs, which live in the stomachs of all horses, now and again attack the coats of the stomach, and begin gnawing through. Then only are they dangerous. At other times the wise men agree that they are harmless, if not positively beneficial. Anything which stops their gnawing cures the disease. Signs of it are great uneasiness, almost constant and violent rolling, with motions of the head toward the side, and sometimes bites over the stomach. All the colic-drenches are good for botts; the chloroform is perhaps most effectual. But a strong tea of worm-seed—Artemisia—is better if it can be had. Sweeten it well, preferably with molasses, and give milk-warm. Failing the worm-seed, a small bottle of almost

any good vermifuge, dissolved in warm sweetened water, will, nine times in ten, put botts to rout.

After colic or botts it is well to give a few days' rest, with light feed, and moderate purges every other night for a week. Mix a dram each of powdered rhubarb and powdered aloes with their own bulk of corn-starch, wet with syrup to a stiff mass, and divide the mass into three pills. Roll the pills while wet in powdered red-oak bark. Open the horse's mouth wide, put the pill far back on his tongue, and hold his head up until he swallows it. Mix together an ounce of powdered copperas, a pint of salt, and a pint of clean hickory ashes. After the purge, keep this mixture where the horse can lick at will.

Acute attacks make drenching imperative, but it must be done with understanding. If half the drench gets down the poor beast's windpipe, he may be cured of colic to die later of lung-inflammation. If there is dry chloral at hand, wrap forty to sixty grains of it in soft paper, to form a sort of cartridge, open the horse's mouth, and cram the cartridge down his gullet. This for desperate colic. Where a course of medicine is required, give it either in mashes, in pills, or mixed in mild jelly, which can be laid well back on the tongue, and will be swallowed to get rid of it. Make the jelly of arrowroot, corn-starch, or oatmeal. Cook it thick, but take care not to burn it, and stir the medicine through it while hot. Oatmeal-gruel, very well cooked, slightly salted and given milk-warm, is excellent for an ailing horse, and not bad for a sound one.

Feel a horse's pulse at the artery under the upper point of the jaw. Normally it is slow, not more than forty-eight beats to the minute. Anything above sixty beats indicates fever, unless, of course, after exercise. To take a horse's temperature, press a clinical thermometer against the skin under the jaws, shielding the thermometer with a well-crumpled cloth. Note where it stands,

then let it cool, and try it upon the nearest sound horse. The difference, if any, will show the degree of fever.

Distemper and Pink-Eye

Distemper is highly contagious. So is pink-eye. The minute either is suspected, isolate the sick animal, and fumigate the whole stable. The symptoms are redness of the eyes, especially about the inner corners, slight runnings from eyes and nose, cough, fever, and swelling of glands beneath the throat. Country, especially south country, stablemen have faith that keeping goats in the stable is a sure preventive of distemper. The remedies for it are legion. Next to absolute rest, cleanliness, and protection from draughts, these are some of the best. Take equal quantities of inner bark from dogwood, wild cherry, red oak, and yellow poplar, dry it in the oven, powder, mix, and give two tablespoonfuls of the mixture in warm mash every night. A little oil-meal or flax-seed meal in the mash is soothing to the inflamed throat. Cut the hay fine, and steam it soft, but give plenty of it. Feed all grain in mashes, and once in three days give the oat-meal gruel. Every morning put a handful of live coals in a pan, hold the pan six inches from the horse's nose, and throw a teaspoonful of flowers of sulphur on the coals. Hold the horse's head, so he may get full sniffs of the smoke. Now and again, instead of sulphur, burn feathers or old leather, scraped fine, under his nose. The astringent smoke reaches the seat of the disease, and helps to heal and strengthen relaxed tissues. For the swollen glands, mix equal parts of turpentine, sweet oil, ammonia, and spirits of camphor, shake well, and apply with a feather all over the swelling. Repeat daily, and every other day wash the swelling with warm carbolic soap-suds.

Glanders

Glanders, the most deadly of horse ills, is, in the initial stage, something like distemper. If, in spite of treatment, the discharge from the nose persists, becoming thick, purulent, and offensive, either call in a competent vet at once, or turn out the animal where it cannot possibly infect others until the disease declares itself. Immediate death is the only kindness to a glandered horse. The disease is incurable, and fearfully infectious, attacking men as well as animals. The best thing to do with a stable much infected is to burn it outright. Where that is impracticable, remove and burn floors, mangers, and stall-partitions, scrape walls, fumigate with burning sulphur, then wash the whole place with the bi-chloride solution (see Disinfectants), and finish by applying two coats of strong carbolic whitewash, as near as possible boiling-hot.

If a pasture has been infected, it should be at once ploughed up, and kept under plough for at least two years. A heavy liming before the ploughing will help to eradicate the disease. Dead animals should be burned if possible, and, failing that, buried at least ten feet deep.

A Foot-Disease

Scratches is a foot-ail, the penalty of ill-kept stables. The ankles swell and get raw, and the crown of the hoof itself grows tender. To cure scratches, give the animal a clean stall—a floor of fresh hard-packed earth is best—wash the feet well every morning with warm carbolic soap-suds, and grease the raw spots with neat's-foot oil. Light work will help rather than hurt. Standing in stall, indeed, is one of the worst things possible. But do not drive through sand, nor over deep mud, and, upon coming in, wash the feet well, cleaning out the hoofs carefully,

rub them dry with soft cloths, and apply fresh oil. If there is much inflammation, mix a little strained tar with the oil; it should be a little thicker than cream. A handful of the bark-mixture (see Distemper) now and then in the feed will help. So will a sprinkle of Peruvian bark in the hay about once a week. Barks are nature's tonics, which, in a state of nature, horses constantly administer to themselves.

Hoof-cracks have but one cure—absolute rest until the crack grows out. Incidentally, running at grass, with a very light plate nailed on below the crack, helps by preventing fresh cracking. Give generous feed in addition to the grass; the hoof-crack is generally more serious as an indication than a fact. A horse properly nourished and in perfect condition has tough elastic hoofs, unlikely to split under any reasonable strain.

Shoeing a horse is no light matter. Nearly half of lameness and bad action comes from improper shoeing. Shoes need to be taken off every six weeks at the latest. But never allow a blacksmith to rasp down a hoof to fit his own idea of a shoe. A horse should be measured for his shoes as carefully as a man or woman. Let him run barefoot for, say, three months upon a good pasture, well turfed and free of rocks, so the hoofs will develop normally. Then lay a sheet of paper under each foot, and with a pencil outline the feet accurately. Mark and number them so there shall be no mistake. Keep the diagrams, and insist that the shoes shall in future conform to them as nearly as possible. Horses get corns from bad shoeing, and, further, "toe in," or "out," in the effort to favour tortured feet.

Seashore residents cannot do a better thing for themselves nor their horses than to have the animals ridden knee-deep in the salt water for at least an hour every day between April and December. A pasture, inland or outland, is better for having in it a clear pond, where horses

can stand at ease, soaking their fevered feet. With neither pond nor ocean available, bathe a horse's feet and legs as high as the houghs well every morning in hot weather, and at least twice a week in cold.

Wind-galls are bony enlargements upon or, rather, below the hough-joints. They are incurable, but may be much mitigated. Commonly they come from over-straining, with standing still afterward to cool and stiffen. When there is much swelling and inflammation, bandage with flannels wrung out of hot water until the swelling is sensibly reduced, then rub dry, and apply turpentine liniment. (See Distemper.) Bathe the hough well with it, then bandage with dry soft flannel. Exercise the animal twice a day; slow driving will not hurt if there is a light load. After a day or two, mix laudanum in the liniment, as much laudanum as there was turpentine.

Splints need pretty much the same treatment. If they are severe, so big as to disable the beast, put on a bandage wet with turpentine, with a dry bandage outside, then iron with an iron just below scorching heat. Do not keep the iron on the splint too long. Raise it after a half-minute, and apply it again when the place has cooled a little. The turpentine vapour will most likely raise a blister, which must be kept clean with carbolic soap-suds until healed.

Swinney, Spavin, Galls

Swinney, which often originates in corns or some hurt to the feet, is a shrinking and wasting of the muscles, most commonly shoulder or quarter muscles, both pitiful and dangerous. Rest is the first essential of a cure. Perfect cures are, however, rare. The best treatment, which must go along with rest, generous diet, and sanitary surroundings, is hard rubbing twice a day with a stimulating liniment. To make it, take equal parts of spirits cam-

phor, spirits ammonia, and apple-vinegar—the stronger the better. Mix, and shake hard before using. Rub it in first with the palm of the hand; then, when the surface is hot, with a block of wood covered with at least four thicknesses of flannel. Rub hard, but take care not to bruise. Run all down the leg to the crown of the hoof. Wash now and then in warm soap-suds, so as to keep the pores of the skin open. Turpentine ironed well in is also helpful in many cases. Aggravated ones require a seton at the point of the shoulder, but it needs a competent vet to put it in.

Spavin, likewise, requires a counter-irritant treatment. The most that can be hoped for is to palliate it. Once it is well established, an animal always suffers more or less from it. Still, he may live to old age, and be fairly serviceable, if he gets reasonable care. Rubbing as for swinney is helpful. Six months at grass will check and, in a measure, cure both swinney and spavin in the incipient stage, evidenced by a slight tenderness of the affected joint, a scarcely perceptible limp, and a tendency when at rest to stand tip-toe upon the sore foot.

Fresh collar and saddle galls need to be washed clean, then covered with soft linen wet in the marigold or balsam-cumber infusion. (See Healing Simples.) Wet the linen two or three times, and leave it on for twelve hours. After that, with rest the galls will heal, leaving no lumpy enlargement to gall again. An old festering gall, already the size of a pigeon's egg, needs to be well washed in carbolic soap-suds every day, then to be anointed with the elder-flower ointment. (See Healing Simples.) If after a week it does not heal, sprinkle dry calomel over it, let it stay three hours, then wash off, and renew the ointment. But with galls, as everything else, the best cure is prevention. With harness and saddles properly cushioned and adjusted, galls are unknown.

Treatment for a Sick Cow

A sick cow is among the hardest of domestic propositions. Milk-fever, or apoplexy, which comes in the first two days after calving, is nearly always fatal. The signs of it are a chill, drooping head, and generally swelled appearance, especially in the udder, but with no flow of milk. The hind-quarters are insensible; they may be deeply pricked without making the cow flinch. Since the disease commonly attacks the best and deepest milkers, it is thought to be due to a perversion of that secretion. The best cure for it is prevention. Feed the cow well, but give nothing that is stimulating. Let her have free exercise almost up to the time of calving, keep her quiet at calving, and away from draughts or cold winds. Bed her well, and let her stand by good hay. The exertion of chewing it helps to keep up circulation, which is the essential thing. At the first symptom, send for the vet. He may come in vain, but let him come.

Bloating is a more common ail, but one that should never exist. It is so easily preventible, loss from it is inexcusable. The cause of it is too rapid cropping of watery green stuff, especially young clover, with the dew or rain still on it. It is crowded into the outer of the cow's many stomachs, ferments there, and sets free quantities of gas. Unless the gas-making is checked, or the cow relieved of the accumulation, she will die, and that very quickly. The simplest remedy is to drive the cow hard, keeping her running until she is ready to drop. The exercise calls the blood from the stomach and, in a measure, checks the development of gas. With a badly swollen animal, the only thing is to stick a keen knife into the animal's side, between right hip and shoulder, so as to barely pierce the outer stomach, and let the gas escape. This, however, requires greater nerve and knowledge

than most amateur dairymen possess. Unless the knife goes in just the right place, it may mean death.

A drench of turpentine and lard (see Colic) will save five cases in ten of bloat, unless they have gone too far. But it is much better to keep cattle off wet clover, also to accustom them to green food, by letting them run on grass only a little while at a time, gradually lengthening the pasture hours. Thus they are not so sharp-set for green stuff as to harm themselves with it.

A lousy cow, and especially a lousy calf, will never thrive. Clear off vermin by washing well with larkspur soap-suds (see Insecticides), using them very hot, and sprinkling either powdered larkspur or flowers of sulphur lightly through the hair along the back-bone. Do not put on the sulphur in rainy weather even if the cow is well stabled. In hot dry weather, mix a handful of sulphur well through a peck of road-dust, and dash it by shovelfuls all over the cow, after the morning milking. Brush it well off before beginning to milk at night. Rub back of the ears and between the horns with a bacon-rind dipped lightly in sulphur. Those are almost the only portions of the cow's anatomy she cannot reach with her tongue or her hind-feet, so there the vermin harbour.

To prevent a caked bag, milk the cow clean six hours after calving, and wash the udder well in clean hot water after milking. Wipe it dry, then rub and knead it gently with the hand, taking care not to bruise or pinch it, nor to bear hard upon swollen tender spots. But keep at it for at least ten minutes. If there are no hard places, wait twelve hours before milking again. But if there are swollen spots, especially in the hinder part, milk clean again in six hours, wash and knead the udder as before, and rub the swollen spots well with a clean bacon-rind. Sometimes a bad cake may be avoided by milking the sound teats very clean, then letting the calf get at the sore ones. A vigorous and hungry youngster will hunch away lumps

no self-respecting cow would allow the milker to handle. If the udder is kept clean and free from the start, the inflammation soon goes down of itself.

Scratches, abrasions, and tender teats can be cured with the marigold infusion. (See Healing Simples.) Wash the udder very well before milking when the marigold is used. It is sovereign for snags and wounds of all sorts. Chaps commonly yield to beeswax mixed with olive-oil to a very soft salve. Rub it between the palms until creamy, and grease teats and udder well after milking. Wash off the salve once a day with tepid soap-suds, and dry the udder well before letting the air strike it.

If for any reason it is desirable to dry up a flow of milk, as a mare or farrow-cow, grease the udder every morning with salty grease; the fat from breakfast bacon is excellent. Every other day rub the udder very well with a bacon-rind. Do not milk unless painfully distended; even then do not milk clean. Give dry feed rather sparingly for a day or two, leaving off mashes, roots, fruit, and fresh-cut grass. As soon as the milk-flow diminishes sensibly, increase the ration, but keep it for the most part dry, until milk-giving ceases.

Chapter *NINE*

Pets and Poultry

EVERYBODY is the better for some sort of pet, a plant, a bird, or a four-footed companion. This even when there are children in the house to keep hearts soft, and sensibilities fresh. Children themselves, in caring for their pets, get a liberal education in forethought, as well as a working knowledge of rudimentary sanitation. Still, in the judgment of this writer, the late Colonel Waring spoke truth in saying: "A dog in a city is a dog out of place." Notwithstanding, since there are so many dogs in cities, it must be told how they can best be kept healthy and happy.

Dogs and Dogs

There are always dogs and dogs. Very much depends on the choice of them, which in turn should depend largely upon the prospective environment. Manifestly a big dog—St. Bernard, Newfoundland, mastiff, even a greyhound, or Irish or Gordon setter—is a mistake, artistically and materially, among the furnishings of a cramped city flat. Such a beast needs at least an acre of ground to save him from being, as artists say, "out of drawing." Contrariwise, a fluffy spaniel, a lithe toy terrier, or fox-terrier, or a natty pug, will look very much in place.

Whatever the dog, his treatment is largely a matter of don'ts. Don't keep him too close; don't over-feed; don't over-bathe; don't make him miserably fine; don't

let him lie in draughts; don't let him suffer from fleas; don't wash him, if he needs washing, with any sort of yellow soap—the resin of it sticks in his hair, furring it all up; don't let him go too long without water—let him drink whenever he pleases; lastly, don't feed him the same thing day in, day out. Give him the wholesome variety a human palate demands.

Dog biscuit is very well indeed, but should not be fed oftener than once a day. Once every other day is better. In between give table-scraps, oat-meal porridge and milk, pure milk, corn-meal cooked to mush in meat gravy, and, along with all of them, bones. A very little raw meat now and then is good, especially for a dog weak and spiritless. A small house-dog needs but one hearty feed daily; give it about two o'clock, after a light breakfast. Hunger is the root of much dog-mischief, wherefore feed a dog which runs about outdoors most of the time, two or three times a day. Give him what he will eat up clean. If he leaves food in the dish, diminish the ration one-half until he appears sharp-set. Do not let food stand where he can return to it again and again. Good, hard solid bones are the exception. A dog can gnaw at such until he is tired, yet do himself no harm. Small bones, as of game and fowl, must be fed with discretion; they may stick in the throat or intestines, with fatal results.

Fleas are prime dog-pests. To rid a dog of them, muzzle him well, then wash him thoroughly with tepid water and either carbolic or larkspur soap. (See Chapter on Insecticides.) While he is in the water, comb him carefully all over with the coarsest make of fine-tooth comb. This will bring away the half-drowned fleas, which the water will finish. Wash out the tub well, then rinse the dog clean of even the smell of soap, rub him dry with coarse cloths, and keep him out of draughts for a couple of hours. Let him stay muzzled for that space of

time, so he cannot lick his coat until it is thoroughly aired. When there is no longer a suspicion of dampness on the skin, part the hair along the back-bone and between and behind the ears, and blow into it, with tiny bellows, a light coat of flowers of sulphur.

For mange, bathe with sulphur soap, and, after drying, rub the affected spots with flowers of sulphur stirred well through fresh unsalted butter. Wash all trace of milk out of the butter before putting in the sulphur. This ointment is good for all sorts of skin troubles, but where a dog or any sort of pet is seriously affected, no time should be lost in consulting a veterinary surgeon.

A dog-house, or kennel, should be whitewashed inside and out with cellar whitewash. (See Chapter on Restorations.) Add to it either enough flowers of sulphur to make it faintly yellow, or carbolic acid in the proportion of half-a-pint, twenty-five per cent. strength, to the gallon of wash, or else use larkspur water (see Insecticides) in the whitewash. Any or all of these will make the whitewash a good preventive of both vermin and dampness.

Give a dog exercise in even the coldest weather. If he runs at will, he need not be clothed. If the walking must be a slow dress-parade, put on a warm blanket, and see that it sits snug. In warm weather, the more a dog is outdoors the better. But, when it is very hot, do not forget to provide shade. This is especially necessary for watch-dogs, particularly if they are chained up. A watch-dog ought to be taught to refuse food or drink from anyone but his regular keeper. Thus only is one able to guard against malicious poisoning, or that which might be attempted with thievish intent.

Dogs perspire only through the tongue, but do not on that account need less water. Keeping water always accessible is thought by many to be the best preventive of rabies. True rabies is, however, a rare disease. Ignorant fear magnifies into it all sorts of dog ailments;

sometimes nothing more fearful than that the dog is hot, thirsty, tired, and lost. Any dog in such case will snap at his tormentors. In case a dog is suspected of madness, never kill it summarily. Instead, confine it where it can do no possible harm, and keep it under observation for at least two weeks. Thus in nine cases out of ten the "madness" will be shown to be something quite distinct. Nerve-specialists agree that where true rabies has slain its hundreds, pseudo-rabies, self-induced by brooding fears, has slain its thousands. The fact makes it all the more imperative to call in a veterinary at need. Failure to do so is, indeed, little short of criminal, especially in the case of a dog well-beloved, and a populous community.

Care of Cats

Cats are by nature dainty, even in their cruelties. There is all manner of feline grace in the way they play with mice. Cats suffer much less from constant housing than dogs, although they run wild much more readily, and never quite get over their murderous instincts. A cat of fancy breed, as Maltese, Angora, Coon-cat, or Manx, is a possession more fashionable than precious. Each and several, they are no end decorative, but in affection, intelligence, and playfulness, they rank below their black, and grey, and tiger-marked, and tortoise-shell brethren.

White cats are in general more savage and less intelligent than grey or tortoise-shell. Many white cats have blue eyes, and all such are said to be stone-deaf. Hence they are less desirable in the house. Unlike dogs, cats require to have their meat raw. They must not have too much of it. Milk should constitute at least a third of their food. Crumble stale bread in the milk, and now and again beat up a raw egg in it. A bit of raw liver, as big as two fingers, or a fish-head, is meat enough for a

day's ration. Supplement it with milk and bread, or milk and mashed potatoes, a cracker or two, or a bit of hard bread, lightly buttered, and a few small bones, as from chicken, game, or chops.

Cats, as well as dogs, suffer a plague of fleas. Oddly enough, cat-fleas are unlike dog-fleas; if the two sorts of insects meet upon one poor beast, there is a fight to a finish, ending commonly in victory for the cat fleas. They are bigger and more voracious than the dog fleas. If left to ravage unchecked, they soon reduce a sleek healthy cat to a miserable skeleton, suffering all over from eczema. To get rid of the fleas, wash with sulphur-soap —any good brand which the nearest shop affords—comb out the fleas with a fine-tooth comb while the hair is still wet, then rinse the cat in milk-warm water, dry it with soft towels, and give it after the bath a saucer of warm milk with a teaspoonful of brandy or whisky in it. A kitten should have only a few drops of spirits, and be kept snug in a clean basket an hour after the bath. When the hair is very dry, blow in all along the back-bone some sort of good very fine insect-powder, either larkspur (see Insecticides) or pyrethrum. Rub behind the ears with the sulphur ointment directed for dogs. Next day brush out all the powder with a fine close brush, comb the coat lightly, then part it along the back-bone, and rub with the sulphur ointment. For mange, rub all over with the sulphur ointment, keep the cat confined so it cannot lie in the dirt, and, after twenty-four hours, wash it well in hot soap-suds, just comfortably hot, not scalding, rinse dry, and leave alone. In three days, if the mange persists, repeat the ointment and the after treatment. Give the cat meantime plenty of catnip, either green or dry, with a milk-and-bread diet. Catnip, indeed, ought to be given always twice a week. Burn infected bedding, and fumigate sleeping-baskets, or else wash them well over in bichloride of mercury. (See Disinfectants.) Let

stand six hours after washing, then scald plentifully with boiling water, and dry well before letting the cat sleep there.

Cleanliness, the first commandment for keeping all manner of pets, applies with special force in the case of white rabbits, Belgian hares, and cavies, known otherwise as guinea-pigs. All these can be kept in very confined quarters; still, it is better not to venture upon them unless one has at least a back-yard. All are vegetable-feeders, and live largely upon green stuff. A hutch three feet square and as many deep, with a wire-net front, suffices to shelter a pair of such animals, and a run, six feet long by three feet wide, in front of the hutch affords sufficient exercise. Unless the run can be changed daily so as to admit of cleaning, it is best to have hutch and run floored with movable boards, and take up and clean them once in two days. Keep the floor plentifully littered with sawdust, and sweep it well before lifting the boards to wash and scald them.

The hutch is best whitewashed inside and out. Keep in the run a shallow trough for water, and see that it is always full. Feed three times a day; once with grain, as corn, oats, or barley; once with green stuff, as carrot, or beet-tops, cabbage-leaves, new-cut grass or clover, pea-vines, or steamed clover-hay. For the third meal, give potatoes, either Irish or sweet; apples, apple-parings, beets, sweet turnips, or carrots. Scatter the feed upon the floor of either run or hutch, and give all that will be eaten clean. Does, suckling young, should have feeds in between.

To prevent vermin, dust the animals once a week with either corn-starch or prepared chalk, finely powdered, and mixed with one-third its own bulk of flowers of sulphur. Keep the small beasts out of rain for a day or two after the application. The hutch should have a sliding-door easily worked, and there should be also a sort of

tent to shelter the run either from rain or from a broiling sun.

With confined quarters, do not keep too many of such pets. If permitted to breed, a single pair will soon overrun any reasonable space. Sell or give away the surplus. There is ever so much more pleasure in a single pair of well-bred, well-kept pets than in a yardful, ragged, weedy, and degenerate.

Singing-Birds

No really humane person will keep a wild singing-bird in captivity. Canaries, and other cage-bred sorts, which cannot live outside, are admissible. But larks, red-birds, and especially mocking-birds—how shall one protest strongly enough against the cruelty of their confinement! Mocking-birds in particular have to be taken from the nest just as they are feathered. A mocker full grown will not sing in captivity; more, it will beat out its brains against bars, and, given the opportunity, poison its stolen young to save them from prison.

But, since conscience does not always prevail, there are mockers, red-birds, otherwise known as cardinals, and other wild-wood songsters held behind bars. All such should have wide, roomy cages, with roughish round perches, as nearly as possible like natural twigs. They should be fed clean sound grain—cracked corn, cracked oats, also wheat and millet. The best way to give wheat and millet is to hang a bunch of heads in the cage, convenient to a perch. Do the same thing with ripe okra-pods, heads of chickweed, and lettuce; indeed, any sort of seed-head upon which the free mockers and red-birds feed. Give also every day bits of ripe apple, tender greens, either lettuce, cress, or pepper-grass, and at least a dozen freshly killed flies, crickets, or grass-hoppers. In winter a bit of bark full of eggs, slipped in the cage, furnishes a treat. Still, summer and winter the main reli-

ance for food, aside from grain and seed, is the mixture of egg and Irish potato. Boil the egg at least twenty minutes, the potato until it bursts its jacket. Peel the potato, and mash while very hot, sprinkling it very lightly with cayenne pepper. Mash the yolk of egg fine, and mix it through the hot potato. Wash the feed-cup clean before putting in the fresh food. Wash also the bath and the drinking-cup. Take out the paper from the bottom of the cage every day, wash the gravel on it clean, and spread back upon a fresh paper.

Never hang a cage-bird of any sort in a draught. But mockers and their sort do well upon sheltered piazzas in summer weather. Their cages may well have half-an-hour's sun, at morning or evening, but should never get the full noon strength of it.

Canary Birds

In choosing a canary, look for a long-bodied bird with thick plumage lying close and smooth. The long body indicates vitality. Only male birds sing—the female's notes are few, and often rasping. Plumage depends largely upon breed. If it is gorgeously high-coloured, the bird will have to be specially fed at moulting-time to keep up the colour. There is an almost endless variety of coat. German canaries, either Andreasburg or Hartz Mountain, come in deep yellow, light yellow, greeny yellow, mottled, and are, further, both crested and plain. They are nearly all fine singers, though less decorative than the Norwich canaries, whose reddish-yellow coats are due to liberal feeding with cayenne pepper throughout the season of moulting.

Year-old birds are most satisfactory. Under that age they have seldom been taught properly to sing. Seven to ten years is the average, though many birds live until past twenty. Much depends upon the individual, but

more upon the care received. If it is wholly loving care, the chances of long life are doubled.

Train canaries to use without abusing an open cage-door. Thus they give and receive double pleasure. The cage is the place for food and sleep. Other times Master Yellowbreast is better for the freedom of the room. If he is properly tamed, and never handled roughly nor too much, he will be safe in it no matter how many open windows tempt him. The right sort of cage is important. It must be altogether of metal; wood invites vermin. It must, further, be light and airy-looking, with a bottom easily removed, movable perches, and a door that works easily but will stay shut when required. Bath, water, and seed-cups must be of good size, but not too big. A vagrant-minded bird may indulge himself in a bath in the drinking-vessel if by any chance he can squeeze half of himself inside it. If the cage is to hang above a carpet, it is well to have a widely flaring bottom so as to catch the seed or water the bird flings out of bounds.

A canary-cage should never be hung outdoors, in a draught, nor where direct heat-rays stream upon it. Neither must it stand or hang where it is cold. Canaries are by nature tropical, and revel in a steady even warmth. Cold and over-feeding are their chief dangers. A little care puts both to rout. Feed a healthy bird seed mixed thus: Four parts canary-seed, three parts German rape, two parts Indian millet, and one part Turkish maw seed. All the seed should be fresh, of last year's growth, and pure. German rape is adulterated often with both turnip and black mustard seed. To test it for such adulteration, chew a dozen seeds. The true rape is sweetish, turnip-seed bites the tongue, and mustard-seed has the unmistakable mustard flavour. Canary-seed, which comes from Sicily, is firm and shiny when fresh—if it does not shine, reject it—it means staleness. The millet and maw seed are less apt to be old. Maw seed, by

the way, is seed of the opium-poppy, but lacks wholly the narcotic properties of the milky juice which runs out when the seed-heads are cut, and, after it hardens, is gathered as opium.

Hemp-seed should be given very, very sparingly; it is so fattening it causes the bird to moult out of season, and hence to stop singing. Sugar and cake are objectionable for the same reason, though both may be given now and then by way of reward for an especially sweet song. Still, a bit of ripe apple or fig, either fresh or dry, is better, and quite as much relished by the chorister. Every day suspend something green in the cage—either lettuce, chickweed, dandelion, watercress, pepper-grass, or plantain. Take care that none of the greens have grown near poison-weeds; a very little poison makes an end of a bird. A small pod of cayenne pepper, with leave to pick out seeds of it at will, is not only a treat to canaries, but to any sort of cage-birds, and also helps to keep them well.

A little hard-boiled egg-yellow, lightly dusted with cayenne, is good for canaries, say, once a week or once a fortnight. Once a week is best if they are rearing young, also in the moulting season. Keep a cuttle-fish bone always within reach. This supplies what salt the bird needs, besides affording lime to repair bone-waste and build up egg-shells. If a bird looks droopy, and the cage-bottom shows signs of diarrhœa, pour boiling water upon twenty grains of unground black pepper, steep to a strongish tea, then soak a bit of stale bread in the tea, and feed the bird with it. Another way is to dust a strip of very fat salt pork with ground pepper, either black or cayenne, and hang it in the cage, letting the bird eat his fill of it.

Fill the bath every morning; the bird will decide whether or no he needs a bath. In cold weather take the chill off the water, and if the bird picks himself, pecking

out feathers, put several drops of rose-water in the bath. If the picking keeps on until there are bare places, rub them over with the sulphur ointment, flowers of sulphur and fresh butter in equal parts, and use the rose-water every day. Rub in the ointment very lightly, touching only the affected spots, the spaces just underneath the wings where they leave the body, and the back of the neck.

Canaries, indeed, all cage-birds, suffer occasionally from caked oil-glands. The oil-gland is situated just at the root of the tail, and from it a healthy bird each day dresses his plumage. If by any chance the oil hardens in it, it at once makes the bird ill. He sits quiet and droopy upon his perch, not with hanging wings to be sure, but looking as though, like Lancelot of the Lake, he were disgusted with "love, life, all things." Take him gently in the hand, blow apart the feathers at the root of the tail, and look at the oil-gland. If it is swollen and inflamed, press it very gently, but do not try to force the caked oil violently out. That will almost certainly kill the bird. Drop warm soap-suds gently upon the gland, using a medicine dropper, then dry it with a soft handkerchief, and apply a very little vaseline. Next day examine again, and repeat the treatment, keeping it up day after day until the softened gland frees itself.

Do not let a canary's claws grow too long; thence come many ills. But trim them discreetly. Hold the bird gently, so light shines through the claw. Thus the tiny vein in it will be plain to view. Cut so as to miss the vein. If, accidentally, it is touched, hold the foot in warm water until bleeding ceases.

Birds sing best if kept away from strong light. Canary-birds should never be hung near the open upper-half of a window. Miss Virginia Pope, the greatest authority on the care of cage-birds, kept a canary in good condition until twenty-one years old by feeding it and treating it

much as here set down, and never letting it be hung outside.

In breeding canaries, keep the male away from the nest after brooding begins. He might possibly make no trouble, but the chances are that he would drive away his wife, and addle the eggs hopelessly. After the young birds hatch, let both parents care for them. Provide fresh soft food twice a day—hard-boiled egg-yolk, mashed with bread-crumbs soaked in milk, scraped apple, soaked fig, or very ripe berries. All this in addition to plenty of seed and bird-manna for an hour each day. The bird-manna can be bought at any good drug-store. Get thence packages of bird-gravel, both red and white. The red supplies iron; the white, sharp fine grit, to help in grinding up seeds. Buy also bird-bitters; there are several good sorts. Administer them in homœopathic doses by putting two drops in the drinking-fountain every other day.

Beware of mites, particularly in the breeding season. Scald out the breeding-cage well before the birds go in it, and also scald the nest-cup as soon as the young birds flutter out of it. Indeed, as soon as the young can hop, or even be lifted with impunity, it is well to put the whole family in a fresh newly cleaned domicile. The mites are small crawling things, almost invisible to the naked eye. They would be quite invisible but for their colour—a bright cochineal red. They leave the birds at night, and crawl back just before daylight. This habit is, in a way, the bird's salvation. If a bird is infested, set the cage upon a table, and throw a breadth of Canton flannel, woolly side down, all over it, then darken the room completely, and leave it for three hours. Take off the flannel quickly, and souse it in boiling water. Do this several times. After a day or two, cover the cage all night, and whisk off the flannel just before daybreak. Never wait a minute to scald it; the mites scamper and scatter at a

great rate, and will harbour in human hair if they get the chance. Take the bird from the cage, blow its feathers lightly apart, and dust it with a good insect-powder. Scald the cage well with boiling carbolic soap-suds, then with clear water, and dry it either on the range or in the sun before putting the bird back. While getting rid of mites, it is a good plan to put in hollow perches, with holes cut close underneath where the birds roost. The mites crawl thickly inside these holes. Take out the perches before daybreak, and scald them for half-an-hour. This kills mites and eggs—a most important consideration. If an infected cage can be left empty for some time, it is an excellent plan to scald it with bi-sulphide of mercury (see Insecticides and Disinfectants), let it stand a day and night, then scald again in clear water, and leave to air for a week. After such treatment, any all-metal cage will be clean of mites and infective taints.

The Care of Parrots

It is a very open question as to whether or no parrots are altogether desirable pets. Still, for people who like that sort of thing, no other thing is quite so satisfactory. Parrots are of many sorts. The grey Africans are said to talk best, but the white scarlet-headed fellows, and those which are symphonies in green and yellow and scarlet, are very much more pleasing to the eye. In a state of nature parrots eat fruit, nuts, seeds, and, very occasionally, animal food. In captivity, they learn readily to cry and call for whatever is eaten and drunk in their sight. Still, it is not always wise to indulge them. In the main, they should be fed upon nuts, fresh, sound, and newly cracked, ear-corn, all manner of fresh fruit, with a very little raw beef or mutton, mostly fat, cut in bits as big as the end of the finger, and given not oftener than once in three days.

An occasional cricket or grasshopper does no harm. Neither does a swallow of coffee every morning. Coffee is a beverage of which most parrots become quickly very fond. In addition to the coffee, keep fresh water where the bird can always get at it. Keep a bath for it likewise always ready, and let it be its own judge of the need for it. A very tame bird may be allowed to give itself a dust-bath outdoors in the height of summer. Sprinkle a little sulphur on the dust before Polly begins wallowing in it. Parrots are not very subject to lice, but it is well to be on the safe side. Keep everything about the bird—perch, cage, and bath—clean and sweet. Empty food-vessels daily, and permit nothing eatable to be messed over, and dragged about the floor. If possible, give the parrot wider freedom than the cage. Some birds are amiable, even loving. The most part have tempers of their own, and do not scruple to show them. They should never be left loose in the room with children, especially without the presence of a grown person. Parrots are very jealous, and might inflict serious injury upon a baby or very young child. They have also a mischievous delight in nipping bare toes and ankles, often bringing the blood, and laughing impishly to see it. Altogether they are uncanny creatures, given to violent and jealous loves, and still more violent hates. If they needs must be kept constantly caged, see that the cage is big enough, and also that it is provided with a swinging-ring, or swinging-perch, to give Mistress Polly proper exercise.

Poultry

No matter how much care and trouble one is ready to endure, it is out of the question to think of poultry-keeping without a few square yards of outdoors. The square yards may be mostly inclosed or built over, but they must be outside the human habitat. With only a back-yard,

and a right-of-way out of it other than through the house, one may keep half-a-dozen hens, or even raise a brood of early broilers. Half-an-acre gives reasonable space for much more extensive operations. With five acres, or even three, a populous poultry-yard is easily possible. Even then, turkeys must be left out of the count, or else the whole space given up to them. They will not thrive in narrow boundaries, do what one may. So much of native wildness still inheres in the birds of Thanksgiving.

As to Hens

Where eggs, fresh eggs, can be sold at twenty-five cents a dozen the year round, egg-production pays better than raising broilers. The Mediterranean breeds—Black Spanish, Minorcan, White and Brown Leghorns—are the hens for it. Grades between a pure-blood cock of any of these breeds and good native hens lay nearly as well as the pure bloods, besides being cheaper and hardier. The first cost will be two-thirds less, and the expense of keeping something greater, as the grades are stouter feeders than the full-bloods. Fifty hens may be kept, and well kept, in a house eight feet wide, twenty feet long, four feet high at the back, which should face the north, and seven feet high in front, which should face the south. Have three six-light sashes set to slide in the front wall, with underneath the middle one a hole, closed with a sliding-panel, for the hens to pass in and out. Make the entrance-door at one end—the east end if possible. Have a double row of perches across the back, with a twelve-inch board below to catch the droppings. Clean these boards every morning. If they are movable, the cleaning is easier. Save the manure; it is worth twice as much as stable manure, especially for orchard-trees and asparagus-beds. Have the floor of hard-beaten earth, thrown up six inches higher than the ground outside. In winter

lay loose boards over the clay, and keep the whole space well littered with chaff, cut straw, or fine shavings. Every three months whitewash the whole inside, using sulphur, or larkspur, or carbolic acid in the whitewash. Keep in a corner, where the sunlight will strike it, a box of dry dust or ashes for the hens to wallow in, and sprinkle the dust, once a week, with an ounce of flowers of sulphur.

Make the nest-boxes along the front wall, close to the floor, but not resting upon it. Let the hen-hole divide them. Hens are kittle cattle, and, somehow, seem suspicious of nests all in a row. They are also freakish—a dozen often fighting to lay in the same nest, with twenty empty ones in sight. The best way to prevent such freaks, which end in broken eggs, and they in turn in egg-eating, is to keep the nests invitingly full of clean bright straw, with one or even two artificial nest-eggs in each box. The artificial eggs can be bought cheaply, but may be made still more cheaply by filling empty egg-shells with plaster of Paris.

The Fowl Run

Such a house should be built and fully equipped inside of fifty dollars. The next thing is the run. Make it the full breadth of the house, and as long as convenient. Fence it down either side with seven-foot wire-netting, stoutly staked. If the end is a boundary, it had better be paled across or picketed. There must be a gate, tight-fitting, and provided with a lock, " in the end fence". Down the middle of the run set a row of fruit-trees. Shade in summer is imperative. Plum-trees thrive best, or, rather, they give a good shade, and the hens help them to fruit well by eating up curculio droppings. At least three times a year have the run either ploughed up or spaded up, and seeded thickly with some sort of small grain. Rye is best in the fall, about the first of Septem-

ber, followed by oats in March, and millet in June. Spread the hen manure on the run before ploughing, if it can be spared from other uses. The thicker and more luxuriant the green growth, the more eggs and the healthier hens.

With two or three houses and runs, if there is ground outside, it pays to seed it the same way as the runs, and let the hens, or any sort of fowls, pasture it. Where mixing breeds is undesirable, turn out the inhabitants of one run at a time. Green stuff plucked thus from the roots goes a long way toward keeping hens healthy. Hens lay best in the second year. Spring pullets well kept will furnish eggs in plenty from Christmas forward. None of the specific laying breeds can be trusted to sit. They become broody, but if given nests of eggs, leave them after a day or so, and go larking off with the rest. If it is desirable to raise chickens as well as eggs, some other breed must be kept, or else an incubator put in.

Feed laying hens thus confined three times a day. In the morning with soft food—as corn-meal, wheat middlings, wheat-bran, and oatmeal boiled together to a thick mush. If there is milk to go in the mush, all the better. Lacking it, there should be about five per cent. of beef-scraps added. If ground bones can be had perfectly fresh, put in two per cent. of them additionally. Feed what the hens will eat clean. Several small troughs, or basins, are better than one large one. After the feeding, take out the troughs and clean them. At dinner give the hens a feed of whole grain—cracked corn, oats, wheat-screenings, millet-seed, with an armful of good hay to peck and pick over. Scatter the grain on the floor so as to give exercise in scratching it out from among the litter. At night give more soft food, but dry, rather than in mush, with either apples, potatoes, or cabbage, or even chopped clover-hay, boiled soft in it. Give also, some time in the day, fresh apples, or mangle-wurzel beets.

Cut the beets in quarters, and throw them in; the hens will peck out the tender parts without fouling them, as would be the case with smaller pieces.

If raising eggs for hatching, as with fancy breeds, make the house smaller, and keep no more than a dozen hens in a place. Two cocks will suffice for that number. In an ordinary yard, a cock to eight hens is enough. Keep pounded oyster-shells or lime where all the fowls can peck in it, also plenty of ground bone, on pain of having to gather soft-shelled eggs. Further, give fowls of every sort a full supply of clean gravel.

Broilers—Ducks and Chickens

To raise broilers pure and simple, either ducks or chickens, it is often best to buy eggs, use incubators, and devote all one's space and strength to turning out a marketable product. This is unquestionably wise when experimenting; then the end of the market finds one almost free-handed. The drawbacks are the difficulty of getting eggs sure to hatch, and the expense of sheds, brooders, steam-pipes, and so on, not to name the cost of incubators.

Science has gone beyond the mother-hen, but convenience lingers beside her. One embarking in poultry-raising modestly, or on a home scale, had much better stick to her. Fancy fowls are all very well, but good, healthy, common stock will answer every purpose. Hens never lay well for some weeks after moving. Hence it is wise to establish them as early as possible in their new quarters. Feed them well, but not with too much corn. It makes them too fat to lay. Green stuff is essential. The run of a young grain-field will bring eggs at mid-winter. Put plenty of red pepper in the soft food, keep the fowls clean and warm, and save the biggest and most symmetrical eggs for setting. When a hen becomes

broody, scald out a nest-box well with carbolic soap-suds or larkspur water, put some dry larkspur among the straw of the nest, wash the eggs clean, and nestle them well down, then lift Biddy gently and place her upon them. Do not move her far from the nest of her own choice; she will certainly go back to it, if so affronted. Let her come off at her own pleasure, and see to it that she is well fed, but not too well fed, when she does leave the eggs. At the end of a week, hold the eggs before the light and look through them. If they show clear as when fresh, they are infertile, and should be taken out and laid aside. Such eggs hard-boiled make very good feed for young fowls of every sort; that is, unless they are addled. An addled egg looks thick and muddy in the light, and is only fit to throw away. A fertile one will show the forming chick as a dark spot, and, later, the network of blood-vessels in the lining. Hen-eggs hatch in twenty-one days. They should be wet every week in milk-warm water, and lightly sprinkled with it upon the twentieth day. This keeps the shell from hardening, so the chick inside cannot pip it. Duck-eggs, guinea-eggs, and turkey-eggs all take twenty-eight days. When set, take the same precautions as with hen-eggs. All of them can be hatched under a hen, and do very well. Turkey-eggs are oddly sensitive to vibration. Heavy thunder just as they are hatching will often kill the whole clutch.

When the eggs hatch, leave whatever comes out of them—chickens, turkeys, or ducks—in the nest until dry and able to walk. Unless the weather is very wintry, put hen and young ones in a triangular pen, made by pegging down planks a foot wide edgewise. Set a tight hovel in one corner of the pen, and floor the hovel well with loose boards. Set a shallow drinking-trough and a shallower feed-trough inside the pen. The little chicks will eat nothing for at least twelve hours after coming off, but the mother should have a full meal.

Whether or no she shows vermin, grease her under each wing and around the neck with sulphur and butter. Put the merest suspicion of the same stuff on the back of each chick's head. Establish the family comfortably inside the hovel, but if the sun shines, leave its door open. When the chicks begin to run about and peep in sharp complaining notes, they are hungry, and should be fed with stale bread soaked in milk, or greasy corn-bread crumbled into sour curds drained free of whey. Sprinkle a little pepper, either red or black, over the feed. If the chicks get plenty of red pepper in all their feed, they are much less likely to have gapes. Hard-boiled eggs cut up fine may be given the second day. Keep the chicks dry and warm, and the pen clean, by shifting it every three days to fresh ground. Whitewash the hovel inside and out whenever it is needed for a new brood. Wash off the floor-boards daily, and let them dry before they go back.

But, when all is said, the best thing to keep fowls of every sort healthy is free range of freshly turned earth. No amount of care and disinfection will keep the surface from fouling when many fowls walk over it. Every bit of available space should be ploughed and seeded to grain, so thickly seeded weeds cannot grow. Turn hens and little chicks on it as soon as the dew is off. If, unluckily, they can have no such ranging, give them every day a mound of fresh-cut grass, or an armful of hay to scratch over. Give them clean water to drink, and put a little dissolved copperas in the drinking-troughs every morning.

In a week young chicks begin to eat cracked wheat. At two weeks they can negotiate cracked corn. Feed them bountifully, but do not overfeed. Keep them in thrifty growth. Therein lies the secret of profit. At ten weeks old they should be marketable. The average price is twenty-two cents a pound, and the average food

cost, about six cents a pound. Thus it will be seen there is a very handsome margin of profit.

Gapes, the worst ill of broilers, comes from a sort of worm which gathers in the wind-pipe, and chokes the chick. It is bred by filth, or, rather, lack of fresh earth. Where ploughs run freely about a chicken-house, gapes is unknown. Some treat the disease by twisting out the worms with a looped horse-hair. A better way is to put the chicks in a box, and dust them every other day with finely powdered quicklime, or else—and this is specific, even where the disease is well established—to put them in a basket, cover it with a cloth, and set the basket upon a headless barrel, with tobacco burning in the bottom of it. Take care not to smoke too long—the chickens may be as dead as the worms. But, used with a wise moderation, smoking thus is sovereign. It must be kept up for two weeks with each brood, or set of broods; after that the youngsters are too big for the worms. Gapes seldom attack chickens under three weeks old. Unchecked, the chicks nearly always die of it, or are else so stunted they never do any good.

Young ducks grow faster, and fetch more money, in the broiler stage than even young chickens. The best breed for broilers is the White Pekin. Set the eggs under hens, or else incubate them, and feed and care for the ducklings much after the manner of young chicks. Any young fowl indeed, kept warm and dry, and sufficiently well fed throughout its first two weeks, stands an excellent chance of reaching a later broilerhood. A Pekin duck lays from sixty to seventy eggs each season. Water is not a necessity for duck-raising, especially if the ducks are to be sold as broilers. It helps to keep adult fowls clean and sightly, and therefore healthy, but even in their case can be done without.

Turkeys are very delicate until a fortnight old. After that, with plenty of range, they will nearly raise them-

selves. The best food for young turkeys is curds drained fairly dry, and mixed with crumbled corn-bread, and young onion-tops cut very fine. Onion-tops, stale bread, crumbled, and buttermilk all mixed to a soft mush, is another thing they relish and thrive upon mightily. Young turkeys should never be permitted to sleep more than three days on the same place. Shift the hovel or pen and as soon as possible encourage the young birds to fly up on an outdoor roost.

Playing Mother

Children and invalids often find much interest in playing mother to a lot of young fowls. Where there is a farm-house, or an incubator in the neighbourhood, one can nearly always secure a few young chicks to stock a home-made brooder. A cheese-box answers excellently for the foundation of it—one of the big round sort with a tight-rimmed wooden top. Tack either old flannel or cheese-cloth thickly all over the top inside in loose folds and puckers that will hang within two inches of the bottom. Bore several holes in the rim of the box proper, and down at the bottom on one side cut a door four inches square. Save the piece cut out to make a shutter. Tack some wire-gauze over the holes to keep out mice. Set the cheese-box in a bigger square box with no cover. This box must be kept outdoors save at night or in stormy weather. Put a shallow drinking-cup at one side of it, and against the other nail a strip of tin to form an equally shallow feed-trough.

Cover the bottom of the brooder proper with old flannel, and lay over the flannel rumpled cheese-cloth. The cloth on the lid must be thick and loose enough for the chicks to nestle in. To supply warmth, set a tin-pan on top of the cheese-box, fill it with boiling water, and cover

it with a folded blanket. The blanket should be big enough to envelop the brooder, and keep in the heat. In all but arctic weather the chicks will stay warm through the night. When it is very cold, the whole contrivance had better be brought in the kitchen and set some distance above the floor.

Chapter *TEN*

Lawn and Garden

A LITTLE earth—so little even as one square rod—has wonderful potentialities of both pleasure and profit. One may grow fruit upon it, or fresh vegetables, or loads of flowers. Shrubs may bloom and burgeon, or vines supply shady pleasances and choice clustered fruit. At the simplest, the little earth may be turned into a grass-plot, good for many uses of edifying, but well worth while if it did no more than rest tired eyes.

A Grass Plot

Good velvet-green turf does not come by nature any more than reading and writing. Very small plots are best sodded. Sodding is also preferable if one wishes quick results. It should be done as soon as the grass-roots are full of life. The ground to be sodded will be the better for a liberal fertilising, either with a commercial fertiliser or thoroughly rotted stable manure. Have whatever is used dug in well and deeply; rake the surface fine, break up all clods, and, if the turf to be set is very thick, spade off two inches from the top of the plot. Any road-side or hedge-bank will furnish sod for the bringing home. Cut it in squares a foot across, using an axe, or hatchet, or spade; then with a sharp-edged spade lift the squares, and pile in cart or barrow, laying grass-side upon grass-side, or earth upon earth. Set the sods accu-

rately and evenly, crowding them so no seams are visible. Beat them down well with the flat of the spade, and, as soon as the sun is off the plot, drench well. Sod takes beautifully in damp weather, but beware of setting it in wet. Wet earth cakes and packs for handling, hence the grass-roots become enfeebled, and are apt to die before the summer ends. Do not trample newly set sod more than can be helped. Let the first growth begin to bloom before cutting. But do not let seed form—that exhausts the roots, which need all their vitality to occupy the new seat.

No matter how well and carefully done, sodding will not last to match sown grass. So, where time permits, sowing is best. But before the sowing much must be done. First look to the ground; if it is a sand-bank, top-dress with at least three inches of rich clay loam, and spade the top-dressing well in. Spading is for very small spaces. With even a quarter-acre, ploughing and harrowing are in order. Upon free-stone soils, sow a bushel of slacked lime to the square rod, and mix it well in. All manner of grasses, and especially lawn grasses, grow and endure much better for lime at the root.

Ground cannot be too rich for good turf, but it may well be too light. Grass will spring up on sand, or pure leaf-mould, but will not stay there through summer heats. Stiff clays need to have sand and much well-rotted manure mixed into them, and after that to be top-dressed with bone-meal at the rate of two pounds to the square rod. Any sort of earth must have stones, sticks, brick-bats, and so on, removed. If it is wet and mucky, it should be underdrained, and have a heavy coat of lime. Make as fine as possible, then sow very thickly. Four bushels of lawn-grass seed is the least that should go upon an acre. All the seed may not come up; if they should, grass knows enough to die out to the right thickness. Then at first the tender shootlets are a great help one to another if

they grow thick. They shade the ground, and keep to themselves the rain and the dew that would exhale from bare or thinly set spaces. Besides, in lawn-making one is sowing not for hay, but for fine close turf.

There are many prepared lawn-grass mixtures—so many that one can hardly choose amiss. But a word or two may be seasonable. Wet and mucky ground will do best under herd's grass, otherwise called red-top, with some meadow-oat grass, sweet vernal grass, and meadow fescue. Blue grass, best of all lawn grasses, positively demands a limestone soil. It will come up upon almost any, but dies and gets patchy in a seat not to its liking. Deep rich chocolate loam will give a fine sward under orchard grass, but there must be several other grasses to counterbalance its habit of growing in tussocks, and never matting. Timothy is not among the best lawn grasses; it has a delicate root which resents hard usage. Meadow fescue, white clover, and sweet vernal grass mix well with either orchard grass, blue grass, or herd's grass.

Sow in the fall, unless the winters are very severe or the space seeded is upon a sharp hillside. If September sowing is practicable, seed the plot first with rye, and after with grass. The rye will grow high enough to protect the grass against winter-killing. It must not be grazed down, nor allowed to seed next year, but mown just as it is jointing, and allowed to lie evenly, forming a mulch. Six weeks after the rye cutting, mow the grass, leaving the mowing also on the ground. With a good catch the third mowing will be so heavy it should be raked off.

Nothing further remains but to weed and water thoroughly. Sodding is apt to need a great deal of weeding to keep it sightly. Pull out the weeds either after rain, or in the morning while the dew lies. Vigilance throughout the first summer will be rewarded by smoothly beautiful turf ever after. But if in the dog-days weeds are

allowed to seed, the work will all have to be done over again next year. Floating seeds, as those of dandelion and thistle, will be blown in every year. But with the grass-roots properly established they can hold their own against all such chance comers. Dandelion is ofttimes a welcome intruder, but beware of giving it too much room. Nothing is much more untidy than a grass plot all over fuzzy stalks and long, twisty leaves.

If grass-roots freeze out, as soon as the ground is thawed, either roll the grass well or go over it with a heavy flat-faced mallet, and beat down the turf hard. This compacting is especially desirable for the turf of tennis courts and golf greens. After it, there should be no tramping until the earth is mellow and the grass is well started to grow.

Lawn-Planting

Good grass is a choice possession, not to be lightly marred, nor sacrificed for things of inferior worth. Beware of cutting it up into little patchy beds, or crowding it so full of shrubs and vines its sweep and spaciousness are lost. Rockeries are sadly out of place save in spots so shaded, or so drawn upon by tree-roots, nothing grassy will cover the ground. Amid thick evergreen clumps they have some reason for being, yet even there, if the eye from porch or windows travels below the clumps, one had better cover the ground with trailing box-vine, or mass it with small early flowering things such as snowdrops, crocuses, and grape hyacinths.

A deep narrow lawn is generally more satisfactory if the entrance-way is placed at one side. The walk may curve slightly at either the middle or where it comes to the door. Keep the grass-line true with the inner curve, and outside, next the boundary, set shrubby things, or make gay flower-beds. Never plant anything but a vine

directly beside a front house-wall, nor at the edge of a porch. But even such planting is less objectionable than sticking things helter-skelter promiscuously over the grass. Unless there is a good big lawn, do not venture upon anything beyond one central clump. It may be of roses, either a flat bed, or two or three standard trees of sturdy habit, or a dwarf copper-beech, or one of the trailing woody things which have come out of Japan. A rose-pillar is fine in mild climates. It is nothing more than a stout cedar-post ten to twelve feet high, with a rampant climbing rose planted beside it, and trained round and round it till it shows as a column of living green, blossom-wreathed throughout late May and June. A low stone pillar with a hollowed top, and ivy trained all over the outside, makes another excellent centre-piece. Fill the hollowed top with rich earth, and plant the gayest summer flowers in it. Lacking stone, a brick pillar may be built at small cost. Where ivy winters badly, cover the pillar with ampelopsis or wistaria. A brick pillar may have the hollow filled throughout with rich earth, and openings left up and down for planting stone-crop, house-leek, indeed, any of the wall plants.

A well-grown rhododendron is among the best of lawn shrubs; the glossy evergreen foliage is a delight even in winter, and through two months the plant will be a pyramid of bloom. Whatever shrub is planted, give it a chance for happy growth. Dig a hole at least two feet square and as many deep, put three inches of rocks and crocks at the bottom of it, over that six inches of well-rotted manure, and upon that several inches of fine light rich loam. Upon this spread out the roots, after looking them carefully over, and trimming off every bruised, or skinned, or decayed fibre. Set the plant so that when the hole is filled in, it will be about an inch deeper in earth than in the place where it grew. Nursery-grown shrubs are much more likely to give satisfaction than chance

friendly gifts. This not only because one has in the nursery exact choice, but because, through frequent transplanting, nursery stock has many bunchy, branchy fibrous roots ready to take hold at once, while things from a lawn or garden have roots so spread it is impossible to move them without cutting away one-half or two-thirds.

Spread out the roots carefully with the fingers, placing them as nearly as possible the way they grew, then fill in around and over them with fine mellow earth. One person should hold the stem upright while another packs the roots. When they are well covered, fill up the hole, tramp it firmly, and fill again. Tramp a second time, and over the tramping heap loose earth lightly. This is to prevent settling and having water stand around the stem. Fall planting is best for evergreens, grape-vines, and such hardy shrubs as forsythia, lilac, snowball, syringa, and the flowering quinces. More delicate things should be planted as early in the spring as the ground admits of working. Winter setting is seldom advisable. It may, however, be done if the ground is prepared, and holes opened beforehand, while still in fall mellowness. The very worst time to plant is in a spring thaw, or rain, when the ground is soggy wet, and there will be no more freezes to loosen and fine it.

A broad shallow lawn should have an oval grass-plot with only a low bed in the middle of it, and tall shrubs or flowering things massed in the corners. Nothing is so effective in proportion to cost for such corner-planting as that hardy yet humble biennial, the hollyhock. It comes in all colours, is single, semi-double, and richly double, flowers abundantly throughout three months, and asks only a chance to live. A thick row next the boundary makes a waving, blossomy wall. Seed sown one year come to bloom the next—bloom that is the very soul of summer. There are tall-growing varieties and dwarf ones. A dollar will buy seed enough to keep up three

hundred feet of hedge. Further, the seed ripen so easily that, after the first outlay, they can be saved at home. There must, of course, be a yearly sowing, with resetting in the fall, when the blooming plants die. Hollyhocks will grow fairly wherever a cabbage will, but reward care and rich earth with extra royal bloom.

Where the comity of neighbourhoods makes fences a requisite, those of wire-netting covered with vines are highly ornamental, and not too costly. Annual vines—as morning glory, moon-flower, cobæ—are best; they can be stripped from the wire after frost so as not to rust it in winter. Among ornamental low hedges, the privet hedge easily holds first rank, but the proper setting and training of it need a gardener's skill. Hedging for privacy, as about back premises, requires a stout plant, preferably evergreen. Arbor vitæ is good unless the summer sun is too hot, or there are big trees so near the hedge-line they starve and kill it. Osage-orange makes a good hedge against trespassers, either biped or quadruped. So does the native whitethorn if it can be persuaded to grow.

A summer-house is more than a delight if there is room for it. It need not be a costly affair. Little folk will get even more good out of a rough lath construction, thickly overrun with vines, and floored with nothing more costly than clean earth. The baby can sprawl there upon his blanket through the hottest summer days, or the toddlers play games. Build it low and broad, with doors upon four sides, and in either square, round, or octagon shape. Grape-arbours yield as much profit as pleasure, if one is at the pains so to prune the vines as not to waste all their strength in maintaining unfruitful wood. Fruit buds, it should not be forgotten, come out of new wood; that is to say, wood of last year's growth. The nearer the roots these new growths come out, the more richly fruitful they will prove. A vigorous shoot will often

grow fifteen to twenty feet long. Thus cutting away the old vine need not mean spoiling the precious shade.

Flower-Beds and Borders

The soil good for grass and shrubs answers as well for flowers. A rose-bed should be dug out and underdrained with pebbles and broken pots just as should the hole for a shrub. Loam, leaf-mould, and well-rotted manure in equal parts make the best soil for roses. If the loam is heavy, a little sand helps it. Fill up the bed, leaving it slightly higher in the middle. A round or oval shape is best. Roses thus massed both show and bloom better than if scattered stragglingly all along a border. If decoration pure and simple is the aim, plant only two or three varieties in a bed; but a genuine rose-lover will hardly be content with so few sorts. For such the only caution is—plant the tallest sorts in the middle, or else let the centre plants grow up, and peg down those around the edges.

Strong plants upon their own roots are much the best. If roses are home-grown from cuttings, it pays to keep them in six-inch pots until they are in rampant growth. Plant out as soon as danger of frost is over. By fall the roots will be so well established there is no danger of winter-killing if the plants are a little protected. Cover the bed about November with evergreen boughs laid in a circle, butts outward. Over that throw a light coating of straw, leaves, corn-stalks, or stable litter. Tall stems must first be bent down and pegged along the ground. Where the winters are semi-arctic, it is advisable to cover the bed with coarse manure before putting on the boughs. In milder climates the manure is unsafe; it may stimulate to growth in mild intervals, and thus help in the winter-killing.

As to bulbs and annuals, the cardinal rule for lawn-

planting is to mass rather than to blotch. Put the same sorts, the same colours, together. A bed all over scarlet or yellow, or white and green, is ever so much more pleasing than, and trebly as effective as, one ring-streaked and striped, or in rainbow ribbons. The taste for ribbon and carpet planting, indeed, is very bad taste; a ribbon or carpet bed is only a sort of floricultural *tour de force*— "most tolerable, and not to be endured."

Salvia, though not properly an annual, can be treated as such, and well repay trouble. No other plants give such magnificent masses of splendid scarlet from June till the late autumn. Sow the seed under glass in January, transplant from the seed-box to thumb-pots as soon as the seedlings develop rough leaves, and shift into bigger pots as growth demands. A dozen plants thus grown, set out as early as possible, will make all the space about them splendid throughout a long summer. The seed are better for soaking six hours in warm water before sowing. If one wishes to be hedged and bounded with the glory of the summer, one can do no better than to plant along the boundaries lines of tall-growing scarlet cannas, and inside the cannas a double line of salvias.

Phlox, verbenas, and portulacca, all low-growing, will carpet any rich sunny space with bloom continuously the summer through. Sow and shift as in case of salvia. Portulacca is hardy enough to be scattered in the fall where it is to stand, and comes to bloom almost as early as from pot-growth. Its main drawback is its sun-worship; upon cloudy days it keeps obstinately shut. Indeed, in showery weather with glints of sun in between, the flowers open and close half-a-dozen times a day. Considering that it is an ephemeral blossom, dying at sundown, it thus shows a sensitive constancy truly wonderful.

For a yellow border, try marigolds with nasturtiums to the fore, or else the dwarf marigolds in front, and

climbing nasturtiums upon a trellis in the background. Coreopsis give much bloom, gorgeous if something coarse and ragged. Dahlias, tall and dwarf, single and double, like hollyhocks, run the whole chromatic scale, and, further, furnish a superabundance of splendidly showy bloom. Use them, like hollyhocks, to fill in side spaces, corners, or breaks between shrubs. Against a vine-edge or an evergreen background, nothing is more effective than a clump of tall dahlias, snow-white, pure golden-yellow, dazzling scarlet, or royal purply-crimson.

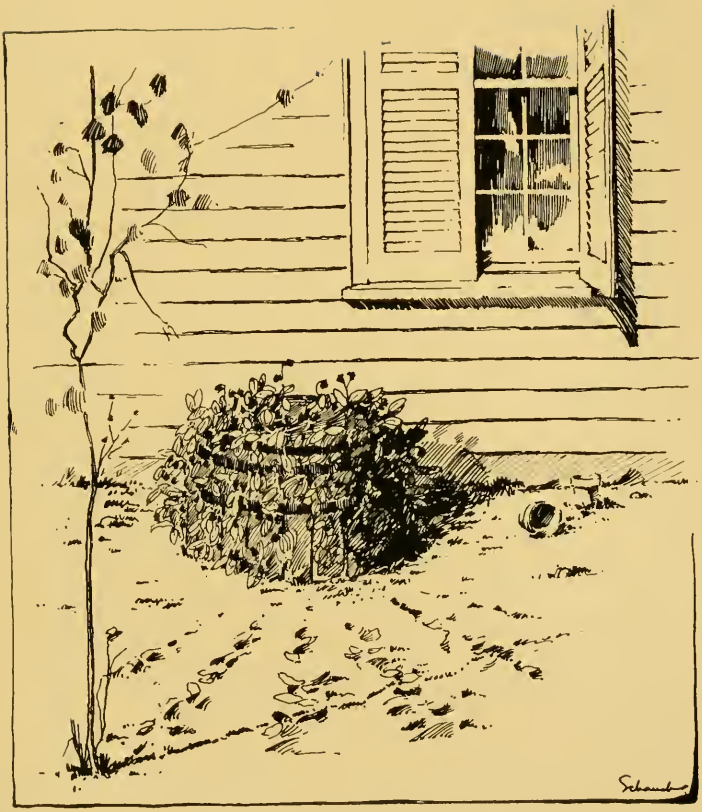
Whatever is planted, eschew straight lines or rectangular settings; let things balance properly, but beware the deadly parallel. Nature avoids it strenuously; in the wilds it cannot be said:

> "Grove nods to grove; each alley has its brother,
> And half the parterre quite reflects the other."

Learn as far as possible, in nature's school, that unity in variety which is the real charm of growing things.

The Fruit Garden

Orchard-planting is outside the purview of this volume, but the fruit-garden comes well within the range of household economics. An acre is none too much for it, yet it may be brought within the confines of an ordinary village lot. The tiniest back-yard has space for at least a grape-vine, a dwarf fruit-tree, and a strawberry-barrel. Set the vine so it may be trained over a light trellis shading the back-door. Dig out a hole for it at least three feet square, and board the hole all round with rough lumber painted with coal-tar. This will last a long time, and keep the vine-roots from damaging drains or cellar walls, if, every fall, when the sap is well down, the roots are cut along the board-line with an axe or sharp-edged



spade. Such root-pruning properly done is an aid to health and fruitfulness.

In the corner furthest from the vine set the tree. Plant both as directed later for the fruit-garden proper. The strawberry-barrel needs all the light and sunshine possible. Set it in the middle of the yard. It must be stout, and well hooped, otherwise it is not worth while. Begin by taking out one head, then bore the sides full of two-inch holes, and the bottom full of half-inch ones. Bury it half-way, fill with very rich earth, set some sort of drain in the middle, and let the earth slope lightly toward the drain. Plant a strong vine in every hole and a row all round the top. A barrel prepared in May or June, and well tended, especially if planted with pot-grown vines, ought to bear next season. The main trouble is to keep it well watered. In warm weather water it twice a day—before sunrise and late in the afternoon. Once a week give a copious watering of liquid manure. Pick out all weeds, and semi-occasionally lighten the earth with a garden-trowel. Protect through the winter with evergreen boughs or corn-stalks. In spring, as soon as the buds swell, water plentifully, and, until the berries are within a fortnight of ripening, give liquid manure twice a week. When the earliest fruit begins turning white, stop the manure water, but double the supply of fresh. By renewing earth and vines every second year, after bearing time, the barrel may be kept indefinitely in commission.

A plot, fifty by one hundred feet, may be made to yield astonishing supplies of fruit. Given such dimensions in the brick-shape unluckily so common, run narrow paths down each side next the fences, and plant in them grape-vines with roots projecting inward. Unless the foot-way is very much tramped, the vines will grow there as well as anywhere. But for six inches around the stems the earth should be kept light and loose, and in winter the

whole root-spread needs a good coat of coarse manure. Train the vines up against the fence, or on wires stretched inside it. Keep the canes well shortened, and in summer prune from June forward, rubbing off all but two or three new shoots. In the fall, cut back these new canes to sound fully ripened wood.

All along beside the end fence dig a trench, four feet wide and five feet deep, the whole plot-breadth. Board up the sides stoutly with well-tarred boards; then fill in first with a foot of stones, brickbats, old shoes, potsherds, bones, and general coarse litter. Upon top of that put six inches of rotted manure, and cover with rich earth to within a foot of the top. Thus, in spite of the boarding which will keep in the roots, the trees will be in no danger of starving.

Plant dwarf fruit-trees in the ditch, spreading out their roots well, then filling in the remaining foot with the finest, lightest earth. Tramp, and pack firmly, heaping the earth a little; then mulch the surface so thickly as to keep down the weeds. Once in six months or so rake off the mulch, dig up the whole space, using a three-tined fork, and never prying out a root; replace the mulch, thickening it as necessary, and water wherever there is even a hint of drought. Fruit-trees will always be the better for a copious sunset watering, also at mid-day or one o'clock, if the leaves droop perceptibly.

A good tree selection is a pear, a peach, a plum, or a cherry. Choose a very early pear, and a very late peach. Very early peaches seldom bear fruit enough to be worth while. A medium early plum will give more satisfaction. Keep down all suckers. Dwarf trees are grafted upon other than their own roots; if alien shoots come up, the budded trunk will die. Summer prune—which means pinch—back all shoots to a compact symmetrical head, flattish rather than round, with no branch extending beyond the trench. Every spring dig away the earth

around the trunks down to the crown of the root, examine for borers, and, if found, dig them out and burn. Wash the trunks well with strong soap-suds the first warm day. If insects attack the foliage, either cover them a tree at a time with a sheet, and burn half-a-pound of sulphur underneath it, or spray well with the Bordeaux mixture. (See Chapter on Insecticides and Disinfectants.)

Plants are very human, especially in their sympathies and antipathies. Thus it happens that blackberry vines do better next orchard trees, even dwarf trees, than any other among the small fruits. Therefore set a double row of blackberries next the tree-trench, planting the vines eighteen inches apart in the row, and setting them alternate, not opposite one to the other. The rows should have a space of two feet between. Set posts in the space ten feet apart, and four feet above ground. Stretch two wires along them, and tie the canes to the wires with bast. Shorten in the tips a third every fall, unless a vigilant pinching through the summer has left them stocky and branchy. Blackberry vines grow one year, and die the next, after bearing. Thus it is necessary every fall to break out the dead vines, and tie living ones in their places. So trained, they yield a third more fruit, have a longer season, and take up much less space. They need a coat of manure every fall, and to have the earth at their roots kept light and clean throughout the season of growth and bearing.

Currants, red, black, and white, have a kinship of prickles with the rampant blackberries, so may go in the next rank. Set each sort by itself, instead of mixing them in the row. Cultivate same as blackberries. If the currant-worm attacks the leaves, sprinkle them with powdered hellebore, or else spray with Bordeaux mixture. Use only well-rotted manure to fertilise, and now and again thin out thick stems with a remorseless hand.

Gooseberries are scarcely worth planting, unless one is

sure of wood ashes to fertilise them. The ashes are sovereign against mildew, which, without them, plays havoc with fruit and leaves. Raspberries so love shade and moisture, and keep so much of the original savage instinct, they grow and fruit best if given a square plot, deep and moist, and allowed to run over it at their own sweet will. Since their habit of growth is like their cousin the blackberry's, the dead canes must be pulled out every fall. Burn dead canes and leaves, and return the ash to the vine-roots along with all the other wood ashes available. Under such conditions the raspberries will take care of the weeds, and hold each other up better than any trellis. They will, further, set generous clusters of fruit, and bring it in their own semi-shade to a luscious perfection no sun-ripened berries ever know.

It is a waste of space to plant apple-trees in such a fruit-garden unless climatic conditions forbid tenderer fruit. Apples will ripen in latitudes too high for either pears or peaches, and any but the very hardiest plums. An apple, or, indeed, almost any fruit-tree, may be grown in a small space by proper pinching and root-pruning. Mark accurately the desired root-spread; then every fall take a long spade with a cutting edge, and force it down at least twenty inches deep all along the line. Pinch in the tips of the branches to exceed this line by a very little. It will be hard work at first, especially in the rampant growth of midsummer, but persistence tells in fruit-culture as everywhere else. Keep the head symmetrical, and be sure to have it open. A round bunch of stems and twigs thick enough for a broom will never, never set fair fruit, nor bring it to perfection. Beware, however, in summer pruning, of leaving young fruit bare. It needs sunlight, to be sure, but only intermittent sunlight filtered through screening leaves. The full blaze will bake and wither it. Spare enough leafy twigs to shelter the young fruit, but pinch out their tips so they may not grow straggling.

Counterbalance the raspberry square with strawberries. Set several sorts; there is a difference of six weeks between the late and early. Plant smallish beds, say eight feet by two, with narrow tracks between. Make a point of understanding a strawberry-bed's evanescence, or, rather, that it is much easier to plant and tend a new bed than to keep an old one in bearing trim. Set two rows of vines to the bed, and vines eight inches apart in the row. Plant in May or June, and cultivate well, keeping runners clipped carefully throughout the first season. There will be a half-crop next spring. After it keep the earth light until midsummer; then let the rampant runners have their way, and root all over it. Top-dress heavily in late fall with well-rotted manure. Next summer, when bearing is over, dig out every vine, pulverise the earth for at least eight inches down, and let it lie fallow a fortnight, keeping it well stirred all the time. Fertilise heavily with either wood-ashes or a good potash fertiliser, and plant again, but change the vines. That is, alternate varieties. Mysteriously, vagrantly, each sort seems to gather from the soil some special element all the other sorts pass by.

Plentiful watering, after the fruit is set, hastens ripening, and increases the crop a third or even a half. So does setting a board-frame around a bed, and covering it with cheese-cloth. The boards should not be put on until blooming ends and the first fruit is set. Berries ripened thus under cover are softer and more luscious than those grown in the open, hence not so good for either marketing or preserving. But for home consumption they are delightful beyond expression. Another thing—by covering a bed or two, the crop is increased and the season sensibly prolonged.

Cold Frames, Asparagus Beds, and Hot Beds

Cold-frames, asparagus-beds, and hotbeds are so correlated they should be kept together. They may be sources of pleasure, or profit, even of mild revenue. Truck-farming has *not* abolished local markets, especially in the smaller places. Truck grown a thousand miles away comes to hand ragged and wilted, and generally too disreputable-looking to have the ghost of a chance against crisp things fresh from under the glass.

Glass is the informing soul of the cold-frame, which is nothing more than a sound trig frame, a foot high at the back, six inches in front, with a sash accurately fitting it, and a bottom of fine light earth. The bottom is also a stretch of garden-bed. Plant it in September with lettuce, radishes, beets, tongue-grass, etc., tend them carefully until frost threatens, keeping down all weeds; then clap the cold-frame over them, bank earth three inches high all round, throw mats or old carpets over the glass upon cold nights, and at mid-day give plenty of air. A cold-frame, six feet by three, well stocked and tended, should keep a family of six supplied with salads and relishes up to Christmas, besides furnishing enough for sale to pay the cost of construction. That should be less than three dollars; the main part is for the sash, which, well cared for, will last a great many years.

A hotbed of the same dimensions will cost possibly eight dollars, depending something upon the cost of labour, and whether or no manure can be had for the handling. Dig out the ground three feet deep, put in a foot of straw, leaves, or coarse litter, wet it thoroughly, and tramp it down one-half. Put in fresh stable manure, likewise wet and tramped, up to the surface level. Then set a frame, a foot deep in front and eighteen inches at

the back, over the bed. Spread six inches of light earth over the manure inside the frame, then bank the frame outside with more fresh manure, piling it slanting, and packing it down hard. A little earth over the manure banks helps to keep in the heat. Put on the sash and let stand several days—until a thermometer thrust down in the earth stands a little above seventy degrees. Greater heat will scald the young seedling. After sowing things take care the bed does not get too hot. If it does, take off the sash, and dig holes here and there down to the manure so the heat may escape.

A hotbed made the first of December, and a second prepared after Christmas, will furnish a constant succession of winter greens and relishes. Sow all things very thickly; they are quickly edible, and may be thinned to advantage. Young beet-tops make a dainty dish indeed, if pulled up three weeks from the time they show above-ground. Protect the sash as for cold-frames, and in very severe weather do not open it, except for a few minutes at a time. In moderate weather give air every day, but not enough to chill the young plants. Aside from the greens and relishes, these hotbeds can provide many things for sale—fine early tomato-plants, cabbage-plants, celery-stocks. Indeed, with plenty of space, and the will and skill to care for them, hotbeds can furnish very decent amounts of pin-money.

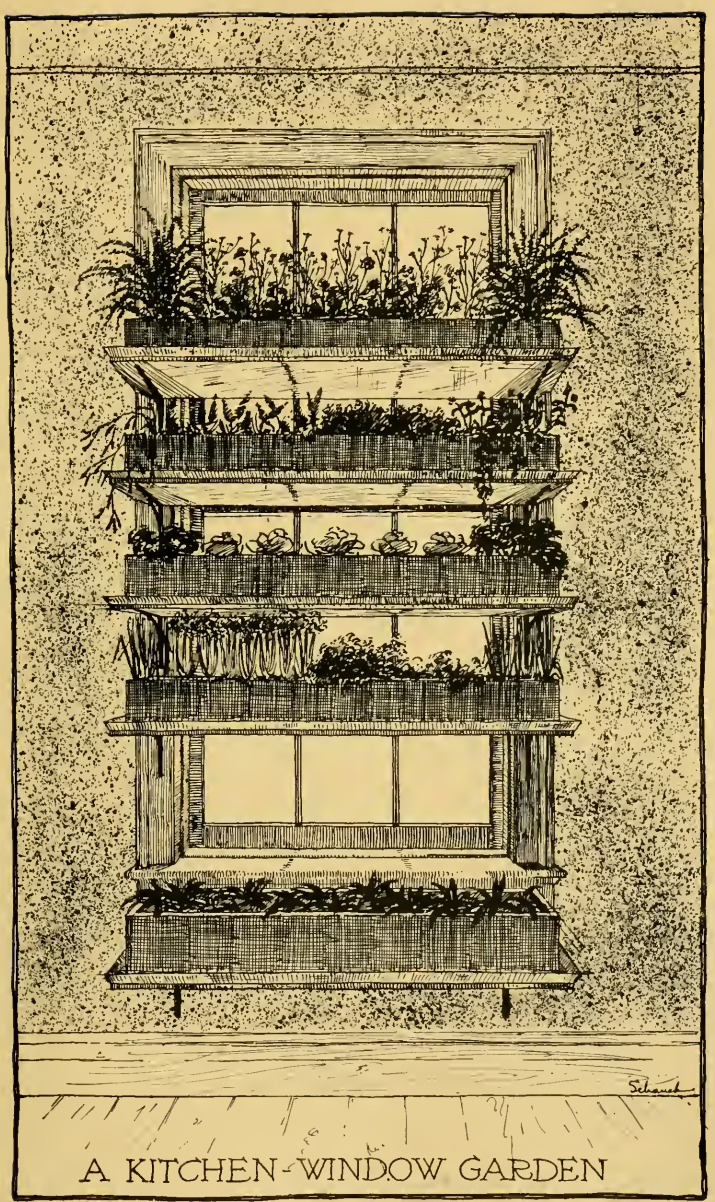
So can asparagus-beds, especially in suburban places. The best dimensions for them are ten feet by two; they must not be too wide to reach across handily. Make them deep and rich; dig out the ground at least three feet down, fill in with rotted manure, put a little fine soil on top, and plant year-old roots ten inches apart in rows down either side the bed. A box six inches high, to hold the bed in shape, is a help. The tips can be cut the second year after planting. Every fall heap the bed a foot deep with rotted manure, and every March, before the tips start,

top-dress it plentifully with salt. This helps to keep down weeds, and makes better stalks. Asparagus is a native of salt marshes, and revels in soil that would kill other things. Keep the beds very clean, and do not cut too late in the season. Let the late stalks grow up and be winter-killed, then cut them and burn upon top of the bed.

Kitchen-Window Gardens

The secret of a contented cook is the kitchen-window garden. Upon many other counts it is well worth while. No matter who cares for it, house-mistress or maid, it can be made the source of infinite pleasure and no little homely comfort. The wise folk who labour in east-side tenements say they always labour hopefully where there is a fire-escape garden showing pot-herbs, or sweet-herbs, or rampant squash and melon-vines, or even starveling stalks of corn. They say, further, these missionaries, that often a growing plant proves their very best auxiliary, and preaches day and night a helpful gospel of cleanliness and cheer.

The possibilities of a kitchen-window garden are almost as wonderful and as various as those of humanity itself. The moist warm air suits all manner of growing things ever so much better than the starch atmosphere of the parlour. The garden, of course, must have the sunniest window, and, if possible, also the warmest one. Have it fitted with shelves rather far apart, and as high as can be conveniently reached. Ordinary wooden boxes, with zinc trays underneath to catch the drip, are best. They should be just as long as the shelves and of varying depths. The deepest, therefore the heaviest, should be on the lowest shelf, which should be of such height as to bring the box-surface level with the window. Plant in this box sweet herbs; it will give space for a supply as plenteous as it is varied. In between their roots radishes



A KITCHEN-WINDOW GARDEN

may grow. The next box should be given over to pot herbs—parsley, fennel, and their ilk. A pinch of kale-seed or mustard-seed, sprinkled over every month or so, will provide supplies of tender greens all the year round. A clump of chives may fill one corner, a knot of leeks another. Tiny onions may be stuck down in earth, and plucked for eating as soon as they are full of sweet-growing juice.

Give the third box to salads—lettuce and its kind. Sow radishes in the lettuce-rows, and pick out either for green herbs or roots as they grow. And in the last two of the boxes, one may grow flowers, either using them as seed-beds for later plantings, or filling with some such perennial favourite as mignonette, or sweet alyssum, or lusty geraniums, both sweet-scented and flowering.

Water the boxes whenever the earth looks the least dry on top. Fill them with the richest earth, and give fortnightly a supply of ammoniated bone-meal. Put fresh earth every autumn into the boxes of vegetables, and give the sweet-herb bed a thick top-dressing of earth as well as the liquid manure.

Vegetables

With a garden-plot really worth the name, set fruit of all sorts around the edges, not forgetting a grape-arbour over the gate, and partly in the back-yard; divide the space with walks crossing exactly in the middle, and make another very narrow walk, all round next the fruit borders. In the four big squares practise rotation. One year plant potatoes, next year small things, a third year peas and beans, and a fourth corn, or cabbage, or melons. For, with this sufficient garden-space, all manner of eatables can be home-grown.

Manure garden ground heavily in late fall, plough under the manure, and leave the ground rough. In the

spring harrow fine, or else cross-plough, breaking only three inches deep. Lay off rows for cabbage, potatoes, and beans with the slope of the ground, so they may drain themselves. Rows for very early things, as peas, beets, and radishes, ought to run due east and west. Then, by standing a board a foot wide on edge along the north side of the row, there is protection from frosty winds and reflected sun-heat to hasten growth.

Good green peas are very much a matter of good seed. The earliest sorts are bush-growing, either sugar or wrinkled. Make three or four sowings a week apart, as these little fellows have a trick of filling out all their pods almost simultaneously. The tall-growing May peas and the heavy marrowfats have a much longer season, but are by no means so delicately tempting as what French folk call "little peas." To get the full benefit of the little-pea flavour, they must be picked before the pods are full, when the peas proper are a little more than half-grown. A row sown at the same time, and one half protected with the upright board, the other left bare, will be a week apart in blooming and filling out. With beets and radishes, there is also a very perceptible hastening of growth. Sow the two together, dropping the seed almost side by side. Radishes are audaciously strong, and break through crusted earth that would smother weaker seed. Besides, they grow so quickly they are eaten and out of the way before the beets have fairly found themselves; then, too, pulling out the radishes gives the beets a delicate working when most needed.

Sow tomato and early-cabbage seed in a January hot-bed, give the plants air at mid-day when they show rough leaves, and transplant as soon as there is no danger of frost. Tomatoes do better for potting after the manner of salvias. When set in place, break the pot after it is in the ground, and leave the pieces. Thus there is no disturbance of the fine clinging rootlets. This may seem

a trifle, but makes a difference of a week in the earliness of the fruit.

Start melon, cucumber, and summer-squash seed upon squares of inverted turf, laid upon a board, and set in a sunny window, preferably a kitchen window. Plant them in early March, water well, and the first of May transfer the turf squares to hills. Dig out holes two feet square and eight feet apart for melon hills. Cucumbers and squashes may be set half that distance. Fill the holes with rotted manure to within six inches of the top, then with fine light loam in which the turf is to be buried. Cultivate every week until the vines cover the ground. But beware of planting melons next either cucumbers or squashes. Bees will carry pollen from one flower to its neighbours. Cucumbers and squashes seldom show the taint till next year, but melons often get a perceptible squash-flavour, far from pleasant. Gourds are even worse than squashes, or cucumbers as a cross; hence it is the part of wisdom to plant them, if they are planted at all, as far as possible from garden vines.

String-beans, like green peas, require to be sown in succession. All manner of garden rows are helped by watering with soap-suds, but none quite so much as string-bean rows. Fill a watering-pot with the suds, put on a very coarse rose, and, walking slowly, drench the vines, and the ground at their root. Two or three waterings will be rewarded with early beans in great abundance. Soap-suds also do wonders for young onions—old ones, too, for that matter. Shalots, chives, and the rank winter onions should have a corner apart, all to themselves, and be well cultivated early in spring and late in the fall.

Things transplant best in showery weather, but do not let them get overgrown for want of rain. Make up fresh hills, or rows, open them, pour in half-a-pint of water, and set the plant in the moist spot, then draw dry earth well up about the stem. If the sun is fierce, it may be

necessary to shade for a day or two. Plant in late afternoon, so the night coolness may help the plant to establish its roots. If weather-forecasting ever grows into a science, gardeners will transplant things upon the edge of rain, and let the showers settle them in place.

Gherkins and cucumbers for pickling are best planted in midsummer. This brings them to bearing just before frost, when the sun is not hot enough to scorch and mar the tender fruit. They may be set in between the hills of early cucumbers or in the space from which early corn or cabbage has been taken. Indeed, one secret of good gardening is a succession of crops. Thus weeds are kept down, and tilth, which means in a measure fertility, is kept up.

An Herb Corner

Whoever owns a garden-plot ought to give a little space in it to herbs. A few stalks of dill, a root of tarragon, a marjoram clump, some sweet basil, a yard or so of carroway, thyme, sage, catnip, horehound, cumfrey, and elecampane, give the last touch of homely comfort. Each and several, they must be picked just as they come into flower, dried in the shade, then put in tight paper-bags and hung in the airiest possible place. All that is, save the cumfrey and elecampane, whose virtue is in the root, so they must be left where they grow until wanted. Pepper is another thing no garden should lack. There are twenty kinds of red pepper, but none of them better than the big mild bull-nose and the tiny cherry pepper, which is a knob of scarlet fire. Sow when the ground is warm, cultivate well, and gather when the pods show the least sign of turning. Thus they are stronger than when allowed to hang until a deep scarlet all over.

The season of tomatoes has been so extended by truck-farming, it seems idle to say that in every home with a garden it ought to last from the first of July until after

frost. The early sorts, pot-grown, should fruit a month after setting out. Later sorts started in the hotbed will come on several weeks later. Plants set out in June will furnish a fall crop, besides plenty of green fruit for preserves and pickles, for both of which purposes they are unexcelled.

Chapter *ELEVEN*

Greenhouses, Window Gardens, and House Plants

THE greenhouse pure and simple is possible only in exceptionally favoured localities, where the soil is so well drained, water does not rise in excavations, and the winters are so mild, sun-heat under protecting glass is all that the tenderest plant demands. Whoever in such a location has a stretch of sunny outer wall, with a few feet of spare space along it, may have loads of flowers the winter through at a very slight expense either in money or trouble. All the more flowers if a drum, heated by air from a furnace-flue, is set up just outside the wall. Winter sunshine is cheery and heartening; still, more plants may be coaxed into blossom if there is some slight heightening of its tepid warmth.

For such a greenhouse, dig down beside the house-wall to a depth of three feet, and for a breadth of six feet, all along the available stretch. Put down a concrete floor, six inches thick all over the excavation, and wall up to a foot above ground with either stone, brick, or concrete. Upon top of this wall set a wooden frame; two by four scantlings are stout enough for it. Board up the frame within and without to a height of eight inches. Above that have glass running on to a glass roof. The roof is a lean-to stayed against the house-wall. Have a door in the end, with steps leading down

to it. If possible, have also a door from the house; thus in sharp weather one can go in and out without letting in cold air.

Fifty dollars should build and equip such a greenhouse. Seventy-five is a liberal estimate. Fit it inside with slat walk-ways laid upon the concrete floor, a bench of earth all along the side, its top level with the glass, and racks rising like steps against the house-wall space. Also put strong hooks overhead to hold swinging baskets and pots.

Plant in each outer corner a strong root of some climbing rose—Marechal Niel, or Cloth of Gold, will do excellently. Dig through the concrete floor, and make a deep rich bed for the rose-roots. Let them stay there constantly. Have the roof movable, so it can be raised in summer, or taken wholly away. Train the roses upon wires just underneath the roof. When the sash is out of the way, they will stretch there in ropes of leaf and bloom.

Passion flowers may well be set in a deep box of the richest earth against some part of the house-wall, and trained to cover it with purple bloom. If the greenhouse stands outside a parlour, by making the walls high enough to let the roof reach the tops of the windows, the glass of them may have traceries of living bloom.

Plant seeds and cuttings in the bench—a raised frame of earth—pricking them out into little pots as they grow, and shifting from the little to big ones, to rest upon the stages. Plant bulbs also in the bench—hyacinths and tulips for Christmas blossom about the first of August, and later ones in succession. Plant also a few bulbs in pots. Set them in the shade under the bench for six weeks, until they have struck strong roots, then set in the light, and water freely while they are growing. After the buds are well set, take the pots into the house—seventy degrees will not hurt them, though the greenhouse temperature will run between fifty and sixty. Crocuses

will bloom in it, and many, many other things. Almost any flower will bud, in fact, though for perfect blossom a little more warmth is needed.

A greenhouse artificially heated, whether attached or detached, can hardly be well built and equipped under two hundred dollars. For this sum one gets but a modest space, glass upon three sides; the north wall is of plank or brick, to throw back the heat and hold the door. The roof is of glass, and the floor sunk a foot below surface-level, concreted, to match the rubble foundation walls. Heat comes from a stove set ingeniously outside, so as to furnish a circulation of hot water through pipes under the benches. This circulation, of course, necessitates a steady water-supply, either through pipes, or from a tank, fed from the roof-rains, or an artesian well. Usually the stove-house is over and beside the entrance, thus sheltering the greenhouse from inrushes of frosty air. The house itself must face south or east, and stand as sheltered as possible. Very thrifty gardeners, with a small heated glass-house, make other houses, little more than glass roofs above walled pits in the ground, and keep in them plants coaxed in the heat successively to growth and buds. The pits preserve them excellently; thus, when the spring comes, there are quantities of things ready to bloom—quantities out of all proportion to the spread of glass.

For five hundred dollars one can have a fairly spacious greenhouse with either steam-heat or hot water. Still much more satisfaction may be looked for from an outlay of fifteen hundred. With a greenhouse so costly, the professional gardener comes in. Then, from being a delight, the greenhouse falls to the rank of a simple luxury.

All that has been said of fitting the true greenhouse applies with equal force to the heated glass-house. Further, plants in both must have a generous water-supply, with hose connections, for spraying. They must have also a great plenty of manure—liquid manure and manure

perfectly rotted. The soil for most plants, indeed, is best made one-third of this rotted manure. With artificial heat, use richer soil and more liquid manure than when the sun alone is the source. Growing things, especially those rampantly growing, take up quantities of food that would sour and scald plants in feeble growth or partly dormant.

Keep a box of earth for potting and repotting where it will not get dusty, yet stay dry enough to crumble. The best mixture is one-third rotted manure, one-third loam, the other third equal parts of sand and leaf-mould. Root cuttings in pure sand, keeping it constantly wet. Woody things root best if the slip is of wood just fairly grown, but not quite hard. Things hard to slip—that is, those which are shy of taking root—should have a small tumbler turned over them after planting, and not removed until the bud inside has grown to a young shoot. Cuttings of two to three eyes are best. Cut cleanly; leave no bruised nor jagged edges. With rose cuttings pull off all but one leaf-stalk, and snip that back to a single leaflet. Plant them slightly aslant, heads to the sun, with the bud standing horizontal, not straight on top. Set the same sort in lines or clutches, and mark them, putting a line of cord or thin wood between the sorts.

Soft cuttings, as geraniums, begonias, bougainvilliers, and all their tribe, require stronger heat than roses. Heliotrope roots very readily, chrysanthemums for the barest chance. It is a mistake to keep over old chrysanthemum roots, except the hardy ones which stand in great beds outdoors. All the fine fringy sorts, and the fancy dwarfs, bloom ever so much better from cuttings rooted in December or January. Professional chrysanthemum-growers often root the cuttings of late sorts from an early cutting, taken after the fall flowering. The new cuttings are set out in May or June, in a bench of the richest possible earth, inside the greenhouse. They are planted

eight inches or a foot apart in the bench, and pinched in to a straight stalk, which produces a single monstrous bloom. All summer they are fed with liquid manure, and sprayed in between plentifully with water that has the chill off. Then in November they burst out gloriously under the glass into the riotous fringy flowers as big as the two fists, that fetch their own weight in silver.

A greenhouse always in commission—that is to say, one keeping on hand ferns, palms, and general greenery —needs to have the glass whitewashed all over, and in summer to be very well ventilated. The whitewash not only softens the light, but helps in keeping down insect enemies, which make so much of the winter-gardener's trouble. He keeps them in check partly by prevention, but more by making his plants run away from them. With greenhouse temperature and moisture, it is no feat at all for a plant to grow so fast sucking things cannot harm it.

How to Fight Pests

Red spider, the minute, almost invisible pest, is best fought with smoke and water. Plenty of water liberally applied will in general prevent its appearance, if the plants are healthy in the beginning. Once a month shut the greenhouse tight, set a pan of live coals upon the floor, and burn a pound of tobacco-stems. Keep shut for six hours, then open and air well. Tobacco-smoke will kill red spider, but the fumigation must be repeated as new crops hatch out from remnant eggs. Red spider attacks almost any growing thing, but is especially partial to rose trees, palms, azaleas, and some of the finer ferns.

For mould and mildew, either fumigate by burning sulphur in a closed house and airing afterward, or spray plentifully with the Bordeaux mixture. (See Chapter on Disinfectants.) Be careful to weaken it so it will not scald the plants. Try it by first showering a plant of the

tenderest sort, and letting it stand twelve hours. If the leaves wilt and droop, the mixture is hurtfully strong. Powdered hellebore in water, delivered as fine spray, is a potent insecticide, and also good against some forms of blight, but rather too costly for extensive use.

Carbolic acid in the whitewash, which should be freely used inside the greenhouse, low down as well as on the sash, helps to keep out all sorts of pests. Carbolic soap-suds, rather weak, is also a good plant wash. Try a few leaves in it, so as not to have it too strong. Plain white soap-suds is also good. Suds made with resin soap leaves a deposit that attracts dust, and therefore hurts more than it is likely to help.

Rats and mice require both prevention and cure. Stop up their runs with plaster, plentifully mixed with broken glass, then tack sheet-tin over the place where the run comes into the house. Further, keep traps set and baited constantly. Look at them twice a day; if one is even sprung, burn it out and bait it afresh, so as to catch the maurauder next time. Sometimes one can banish rats, when all else fails, by mixing very thick syrup with caustic potash, powdered, and smearing it well over where the creatures run about. The potash sticks to their feet, and burns; in the effort to lick it off, Master Rat gets his mouth also burned, sometimes fatally. Poisons are unwise; if rats die in the walls, the resulting odours are as hurtful to healthy plants as to human beings.

Slugs, roaches, crickets, and earth-worms, the greenhouse has also to contend with. Eternal vigilance is, indeed, as nearly the price of hothouse flowers as of liberty. For the slugs, hand-picking sometimes avails, but with a house badly infested, try poisoned bait. Make it of arsenic, white sugar, and wheat-bran, in equal quantities —say a spoonful of each. Wet it lightly with warm water, then drop in dabs at the root of the plant most infested. Slugs harbour in earth, and crawling out of it

will attack the bait before going further. Usually the subsequent proceedings interest them no more.

Poison roaches and crickets by setting all about on the floor, under the bench, and especially close about the pipes, shallow saucers, with white sugar and borax sprinkled thick in the bottom. Arsenic may be added to the mixture, but sometimes turns the insect stomach. If arsenic is used, a better way is to mix it with twice its bulk of very finely powdered sugar, then to dip in the mixture cut apples and potatoes, and strew them liberally about the greenhouse, cut-side down. Poison and scatter last thing at night. Early next morning go around with a bucket half-full of water, gather up the apples and potatoes quickly, and drop them in the bucket. Many insects will go with them. Sweep up all dead insects in sight, and burn the poisoned bait and the dead things as quickly as possible. Thus there is no chance that a water-supply may be poisoned, or anything more innocent or more valuable than a cockroach suffer death.

Earth-worms feed in the pots, preying upon tender roots, and drawing to themselves the fatness of the earth which should go to nourish the plant. The remedy for them is lime-water. (See Chapter on Insecticides.) Stick holes in the earth with a stout skewer quite to the bottom of the pot, pour in the lime-water until it stands at the top of all the holes, then leave it to seep through. Most generally the worms will crawl up to the surface to avoid it, and thus can be raked off. But if they are big and bold, as in pots or boxes about big plants, it is better to poison cabbage or turnip leaves with arsenic and sugar, sprinkled on while the greens are damp, and lay them here and there over the pot surface at night. If at morning even one leaf is half-eaten, or half-dragged down, be encouraged. In time every worm will get his dose.

If a greenhouse sours from any cause—too much heat,

too much fertiliser, or too little ventilation—fumigate it well with sulphur, but open the sash in a quarter of an hour, spray the floor, pipes, and outsides of big tubs with tepid soda-water, a pound of soda to five gallons of water; then, when the house is a little drained, dust all the plants lightly with powdered quicklime, mixed with its own bulk of very dry powdered corn-starch and one-tenth as much flowers of sulphur. Shake the powder out of muslin or cheese-cloth bags, so as to speck or, rather, frost all the foliage without covering any of it. Or the powder may be blown from a fine-nozzled bellows. A bag at the end of a long light pole is, however, most convenient.

House Plants

The greenhouse has all the world of flowers for its parish. The living-room, less lucky, must content itself with what will thrive and grow in it. The list is none so long, but still full of choice things. Palms, for example. It is scarcely worth while to attempt house-culture of more than half-a-dozen species; but why complain when that half-dozen includes the fern-like *Kentia*, the lusty round-leaved *Lantana Borbonica*, and the stiff Old World grace of the sago palm!

These, and about as many more, will thrive and burgeon in a sunny window, of temperature that never goes lower than fifty degrees. High heat does not hurt them; they are all children of the tropics. But great and sudden alternations of heat and comparative cold make the leaves spot, and look raggedly disconsolate. Give them plenty of pot-room, but not too much. Shift once a year, if growth requires it, but not oftener. Once in two years is more likely to be right, unless the palm's lines have fallen in exceptionally sunny and well-aired places.

Fertilise every fortnight. A palm in fair growth needs

a teaspoonful of ammoniated bone-meal, either dug in about the roots, or stirred well through tepid water and poured over the pot. In between fertilisings water well, but not too well. Never let water stand in the saucer around the pot. But in watering, keep on until a little shows through. That is proof that the earth is properly soaked. After such soaking, leave it untouched until there are little dry blotches upon the upper surface.

Beware the ordinary jardiniere. Many a good palm and true has died of hideous red or yellow glazed earthenware. Palm roots need air; nice, free-circulating air, not that which is damp, and close, and full of mould bred by confinement. The dampness alone often rots off the fine feeding rootlets, and sets up decay that at last runs on to the main stalk. Keep the pots clean outside. There is hardly a hue more artistic than that of clean, dull red earth.

No palm will thrive unless its fronds are kept clean. In a state of nature, tropic rains and whirlwinds look out for that. Art must in a degree imitate nature. Wherever a palm is not too big, the way to wash it is in a bath-tub three parts full of tepid suds. Take the palm in the right hand, head down, and plunge it head-first into the water, laving and slapping it about, keeping fingers spread over the top of the pot, so it shall not drop out. If it is very dirty, tie a cloth over the pot, so the ball of earth cannot slip out of it, then lay the plant, pot and all, in the tub, the pot upon its side. There rub and scrub both very well. After the scrubbing is done, set the pot upright, draw off the water, and half-fill the tub with clear water; then lay the plant down again, and turn it over and over, until the leaves, stalks, stems, and pot, are thoroughly rinsed. With a finely cut palm it is best to tie the leaves with a soft thick string loosely to a stout stick thrust firmly into the pot. This insures against breaking off, or even straining the crown in the wash of the tub.

Drain off the rinsing water, set the pot again upright, and leave it to drip for an hour. If the leaves were tied, untie them, and shake them well about. Spread a sheet of paper upon the floor where there is good light, set the palm in the middle of the spread, and look it carefully over. If there are any reddish lines or blotches upon the under side of the leaves, wash them off with a soft cloth and weak, very weak, carbolic soap-suds. The red blotches mean red spider, which in the house it is hard either to drown out or smoke out. By constant watchfulness, one may keep him completely in check.

Look also for rust blotches. They mean generally too much water every day. If they appear, cut off the rusty parts unsparingly, and let the pot dry out a couple of days at least, then water well with lime-water (see Disinfectants), let dry three days; then water with clean water, but be sparing of it, until all signs of rust disappear. Clip off dried tips; they mean that the air of the living-room is too dry. Correct the dryness at once. (See Chapter on Heating.) Air too dry for plant lungs is likewise too dry for human lungs.

The next thing is oiling. Rain-washed tropic palms do not have soap in their baths. Hence they are not robbed of any part of their natural gloss. Since soap is necessary to cleanly health, the thing to do is to give back what has been taken away. Pour a little pure olive or pure cotton-seed, or poppy or pea-nut oil, in a saucer; the essential thing is to have a vegetable oil. Make a soft swab by tying a bit of absorbent cotton in a silk rag, dip the swab in the oil lightly, and go over the palm fronds with it, first upon the under side, close to the stalk, and then upon the upper side. Do not dip the swab afresh to go over the upper side; there must not be oil enough there to catch dust. Then go all over the fronds on both sides with a clean dry swab. Do the work very gently,

so as not to bruise the fronds. With sago palms all that is needed is to oil the stiff mid-rib.

Treat ferns exactly as directed for palms, save and except the oiling. Tie up the fronds rather closely before they go in the bath, and let the pot get a soaking as well. Squares of cheese-cloth or old lawn are good to tie over the pots. Set the pot in the middle of the square, and knot the ends across. The best house-ferns are the so-called "Boston" fern, the small sword fern with black stems, and the asparagus fern. The whole maiden-hair family is beautiful beyond expression, but it is idle to think of keeping them in good condition outside a fernery or a greenhouse. With a glass fern-case, the most that is needed is not to give too much water, to keep the glass always clean and clear of lint, and now and then to fertilise with dissolved bone-meal. Such a case needs to be set away from the source of heat, where it will get light, but no direct sun-rays.

The *immortelle* of house-plants is the rubber-plant; still, there are people for whom even rubber-plants will not grow. The sturdy stocky things need plenty of pot-room, great plenty of fertiliser, a fair degree of warmth and moisture, and a very great deal of sunshine. To make them branch low down is often in the nature of a problem. It can be done by almost starving the plant, keeping it away from light and heat, with very little water, until all the leaves fall, save one or two at the tip. This, of course, in an early stage; say when the plant is a foot high. After the leaves have dropped, repot, giving very rich earth, set in sunshine, water freely, and fertilise every fortnight. If growth begins at the tip, tie a cord just below the bud—not tight enough to cut the bark, but to slightly compress the vessels of it. In six weeks buds will be likely to start from several of the cicatrices left by the fallen leaves. Rub off all that are superfluous, and give those chosen every chance to de-

velop. By and by take off the string around the central stalk. It is no longer needed when the branches are well established, and each pushing up for itself. Wash rubber-plants a leaf at a time; they are commonly too unhandy for the bath-tub. Every month or so oil the leaves as directed for palms, but put the oil only on the glossy upper side; the lower side must not have its breathing-pores choked.

There are a few roses that will bloom in the house for people who understand them. But in the main a rose-tree seldom pays for the trouble it entails, unless, indeed, it is a cherished one, taken in over winters, to save it from death. Even then it had better be set in a big box down in the cellar, or even hung up in the cellar, head downward. This if the cellar is damp and mild. In furnace-heat any sort of root would be dried to death. A strong young rose, pot-grown from the start, which has been pinched of every bud throughout the summer, may flower beautifully through a winter. But it will need to be set in the border again in the spring after repotting, and to grow throughout a whole season, and rest over winter, before it can be depended on for another winter's bloom. The best sorts are the free-blooming loose-leaved tea roses, such pink roses as Hermosa, and, among shaded pinks, La France. Any rose-grower's catalogue indicates accurately the best house-blooming sorts. They need plenty of heat and sunlight, plenty of water, a weekly shower-bath—every leaf should be dripping—and a monthly tepid plunge. Fertilise well, and sprinkle a very little sulphur over the top of the pot. If red spider appears, get the smokers of the household to sit close beside the roses while enjoying their cigars. The reward of all this pains should be abundant and lasting bloom. One rose unfolded thus beneath the eye is worth a boxful from the florist.

Bulbs, especially lilies, make charming house-plants,

doubly charming in that they thrive with so little care, and have so few of the enemies which plague woody things. The scarlet Amaryllis, of which there are half-a-dozen sorts, each sufficiently gorgeous, shows handsome long green leaves the year round, very nearly as decorative as those of the costly *Dracena;* then in early spring sends up a tall stalk crowned with three to four truly royal blossoms. It is, moreover, cheap; fifty cents will buy a bulb certain to flower. Plant in a six-inch pot, nearly full of rich earth, set where it has good light, water and fertilise well. The bulb lives on from year to year, sending up richer and richer blooms each season. For every bloom-stalk there comes an off-set, a small bulb, which may be separated, and brought to flowering in three years more. Do not leave the off-sets around the parent bulb. They will end by choking it, without ever equalling it.

Japan lilies, Easter lilies, tulips, hyacinths, tube-roses, the many-hued savage gladiolus, all, all thrive in pots, and can be made to supply a succession of bloom. Bulbs of every sort should be kept dark for some weeks after planting. Aside from that, the care of them is so easy a child or a simpleton can hardly go astray. All need pot-room, a rich earth, and an even temperature. Pots may be kept in a cellar, or bath-room, or kitchen, until almost ready to flower, then take their place in the window. With a cellar, by potting a number and moving out the pots in succession, one can have flowers from bulbs through an almost indefinite time.

Callas do well in big pots which can be left undisturbed for years. After blooming is over, let the plants gradually dry out, and, when leaves and stalks die down, set them away out of reach by rats or mice for a season of rest. Turn the pots on the side, and place outdoors if possible. Along in August set the pots upright, and water sparingly until new leaves peep through. Then

give plenty of water, and fertilise. The calla can be kept green the year round, but will not produce such fine blooms nor near so many of them.

Azaleas are commonly bought from the florist so drunken with bloom it takes two years of care and coaxing to bring them back to normal condition. As soon as they shed their crowns of blossom, they should be cut back at all ragged tips, and set where they will have a good light, but not too much sun. Water freely, but not too often; every two days is enough. Give no fertiliser till the tips show signs of new growth. Then fertilise but very lightly; a teaspoonful of bone-meal a month is enough. If there is a garden border available, in June set the azalea there, and let it stand until October. Repot then, but do not look for blooms next spring. Be satisfied if the plant has healthy green leaves, and shows even half-a-dozen bloom buds. A winter of rest, another border summer, will bring it to the estate of bloom again, but not to such over-luxuriance as the florist and the greenhouse had forced upon it.

Window-Gardens

The first essential of a successful window-garden is stocky well-grown plants, ready and willing to grow and blow, instead of things forced unhealthily into over-luxuriance of bloom and leaf. These stocky plants, full of unexhausted vitality, are not easily bought. At least it is hard to buy them in the right condition if one waits until the window-garden season fully opens.

Raising one's own plants from slips, or seeds, or roots, is far and away the best. Where that is out of the question, buy plants very early; a month at least before they can be set out, or, better still, six weeks. Choose healthy plants just coming into bloom. But do not permit further bloom. Cut off blossoms and buds with a remorse-

less hand, cut back foliage also, but more sparingly, and with an eye to future developments. That is to say, pinch out ends of straggling shoots, or clip away weedy laterals. Aim to make the plant compact; not round-headed like a cabbage, but so well balanced the pot can be spun on edge without tipping over.

Set the plants in a moderate light, and gradually harden them by letting in more and more air every day. For the first fortnight give no fertiliser; let them rest, and "find themselves" in their new environment. When they begin to open pert new leaves, and show signs of pushing out fresh bloom-stalks, give dissolved ammoniated bone-meal, half-a-teaspoonful to a small plant. Shower the foliage plentifully every other day, using tepid water at first, and making it gradually cooler. The end of all this pother is to undo what has been done in the forcing process, namely, to bring the plant back to that estate in life which would belong to it if normally developed.

Still, plants thus bought will never quite come up to those raised in the home boxes. Especially if they are seedlings—such things as verbenas, calceolarias, cinnerarias, petunias, and nasturtiums. Nasturtiums, petunias, and verbenas are the ones best worth while for window-gardening. All of these have a season of bloom as long as the summer; also a graceful semi-pendant habit of growth that fits them especially into window-garden spaces. Seed are best sown early in January—in a box under a big pane of glass if nothing else is at hand. Mix petunia seed with dust or ashes before sowing, do not cover any of them, but press the earth down gently, and water with a very fine rose, or else by spraying with a brush. Prick out and shift like hotbed plants. (See Chapter on Gardens.) By mid-May the plants should be stout and well rooted, ready to burst in blossom at the least provocation.

Nasturtiums make magnificent window-gardens. Use

several sorts together; the trailing ones near the edge, the dwarf and bush-growing ones foaming over the box-surface proper. In colour they run the whole gamut of velvety reds and crimsons, and oranges and yellows, with some approaching white, and others verging as nearly on black. It is impossible to set a well-grown nasturtium where it will not be a thing of beauty, but one never realises fully how very beautiful the plants are until one sees them thus massed in their own loveliness. Nasturtiums do well in partly shaded windows, as easterly or north-easterly, with only the morning sun. If a screen is desirable, the whole box can be filled with the trailing sorts, and the inner row trained to cover a light wire trellis.

For a north window, with only the earliest morning sun, Japanese morning-glories are ideal. They come in all colours; a ten-cent packet of mixed seed sown under glass in January, potted, and shifted, should fill two big boxes. The flowers have a crepey texture, and all manner of delicate markings. The vines grow sufficiently, but less rampantly, than the common morning-glory. They make fine wreathy trails over the box-edge, and will also climb and cover a wire-screen. The blossoms open at daybreak, and thus sheltered from the sun, stay open until a little after noon. The only trouble is to clip the fallen blossoms every day, as, if they are allowed to ripen as seed-heads, the season of growth and bloom will be brief.

Flowering geraniums make a brave show in window-boxes, but for the best effect it is well to have only one colour. Strong-growing single sorts, of either pink, or white, or scarlet, with showy trusses and a habit of profuse bloom, are best. Choose among pinks those with rich creamy or, rather, salmon tones—the purply pink ones do not flower well in summer heat. A good edging for a line of blooming geraniums is German ivy. Set three strong plants in a row at the outer edge of the win-

dow-box, and let all the stems trail over the side. Peg down a branch of geranium here and there over the surface, or else fill in bare spots with clumps of alyssum or pale-blue myosotis.

Woody plants — as azaleas, dwarf evergreens, hydrangeas, and rubber-trees—are out of place in a window-garden. In the nature of things it is ephemeral, therefore make it a show place of passing summer bloom. But in an invalid's room, with a window looking north, it may be well to set up a year-around window-garden, and there the evergreens, and pots of ivy, and privet come beautifully into play.

Indeed, an indoor window-garden may be made a continuing delight. A bay window is best for it, but any deeply embrasured one will answer. Do not have shelves across it. Set some tall, handsome plant upon the floor, a little to one side, and hang from the casing overhead upon the other side, a basket of trailing green —German ivy, asparagus-fern, or any light and graceful vine. Screw folding arm-brackets, with flower-pot holders at the ends of the arms, irregularly up and down the window-casing upon either side. Then shift pots and plants about, trying them in all combinations until satisfied with the result.

The bottom of the window-recess should be fitted with a light zinc tray, coming out several inches wider than the recess. In this mass standing plants about the main one, either as foils or accessories. The tray catches the drip when the pots are watered, and permits watering the standing plants without disturbing them. Window curtains, of course, are impossible, but one may trail over all the panes a rare tapesty of vines and leaves and blooms.

As to the window-box proper, the actual receptacle of roots and earth, one may spend nearly as much or as little as one chooses. A fairly good wooden box, fitted to the

window with hooks and staples for fastening, and painted a dull inconspicuous green, may be had for a dollar; in some places half that amount. Against that set tile-boxes, in silver or silver-gilt mountings, or boxes with stained-glass panels outside, both of which cost a very pretty penny. In between there are boxes and boxes. The one thing needful is that the box shall be staunch, and so set it may not threaten the heads or the lives of unwary passers-by. Fill it with the earth advised for house-plants. But before filling, see that there are holes in the bottom sufficient to insure drainage, and over the whole bottom spread a layer of broken crocks or pebbles fully an inch deep. Put the earth on this to within an inch of the box-top. Even a small box should not be less than ten inches high. A foot is better; thus the plants have sufficient soil.

Plant the edgings first. Set whatever is chosen so the stems shall stand over the box-edge slightly slanted outward. Pack the earth well about the edge plants, and see that their roots are spread, not crowded in a little lump. Make holes close along the inner edge for the row of flowering plants. In growth they will reach for air and light, both roots and branches, so the insetting will help them to room. If vines are wanted for trailing over the inner edge, bring back long well-grown sprays from the outside, in preference to setting out creeping things inside as well as out.

Aim in window-gardening to have the greatest possible spread of leaf, vine, and bloom, with the fewest possible roots. Crowding one thing on another makes a show for a day—for a week even; but, if a window-garden is to be an all-summer pleasure, it must be so planned and managed there will be room for growth. As things grow pinch them back, nipping very tender shoots, almost buds, so as not to let them waste strength. Examine daily for insects. If they are found, spray freely with tobacco

water, or hellebore and water. Make the tobacco-water by pouring a gallon of boiling water upon a pound of tobacco-stems. In use, dilute one-half, and apply tepid.

Everybody knows enough to water a window-garden freely, but precious few recognise the importance of dusting plants well before watering them. Almost invariably window-garden plants collect dust freely. If water comes on top of the dust, it may take some of it away, but will leave more behind. In proof look at a dusty roadside hedge as it dries after a washing rain. There will be streaks, splotches, and spatters of wet dust, turning again to dry dust on at least half the leaves. So, before watering a window-garden, go all over the plants, especially those that are shrubby in growth or have rough leaves, as the begonia tribe, with a very soft thick bristle-brush, tipping and shaking until the loose dust is gone. Then, and not till then, shower the whole garden abundantly. But do not regard showering as a sufficient watering. Soak the earth at the plant roots after the showering is over. In very hot weather water three times a day—at sunrise, noon, and at twilight.

In very hot and dusty weather, especially in late midsummer, shade window-gardens as much as possible from the mid-day sun. With awnings, that is easy. If there are no awnings, put two screw eyes in the upper sash in line with each other, run a stick through them to stand out flag-pole fashion a yard beyond the wall, and drape over it, tent-wise, a breadth of green cambric, for several hours at the middle of the day. Pin the outer edges together, and fasten the lower inner corners to the corners of the box. The flowers in it will appreciate the green shade, and make returns for it in prolonged bloom and delicious freshness.

Chapter *TWELVE*

Plumbing and Sanitation

IF the walls of a house are its bones, then plumbing must stand for veins and arteries. Hence, whether buying, building, or renting, it behoves every home-maker to look well to the ways of it, and, further, to know enough to make such looking effective. While the technics of plumbing constitute a science not easily mastered, certain concrete details are within the simplest comprehension, and it is these concrete details with which home-makers have the nearest concern.

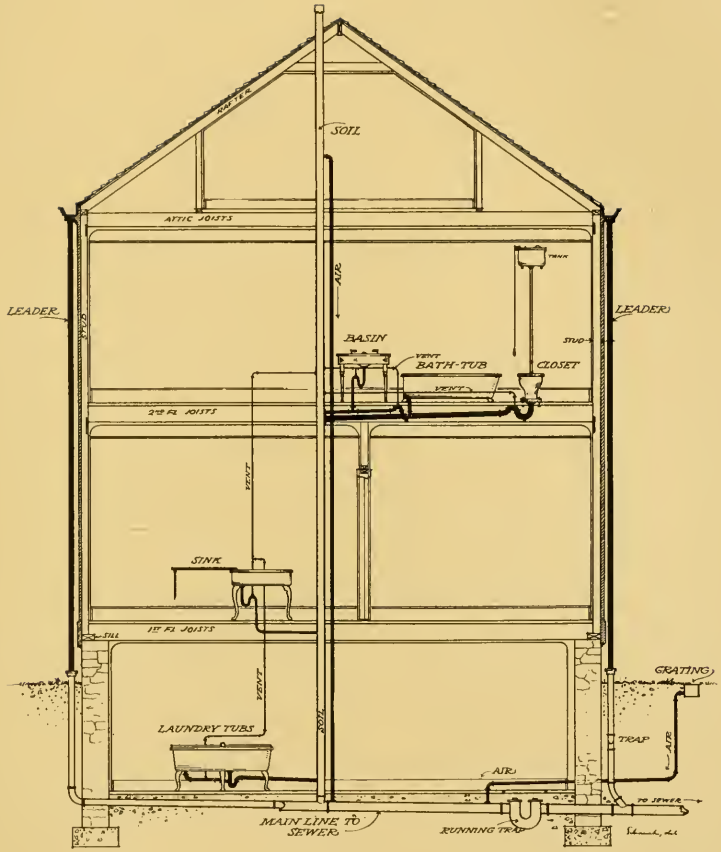
In building, whatever else is skimped or bargained over, let the plumbing estimate be generous. As far as possible have the work done by men who take pride in efficiency. It may seem sarcasm to refer to a plumbing conscience, yet it certainly exists. There are plumbers and plumbers; some as scampish as they are autocratic, but very many more with the full complement of artisan pride in doing not merely fair work, but the best work possible. Such work seems dear, yet in the end is really cheap. Witness this case in point. A home-maker who had bought a house had it newly plumbed throughout before moving in. Two plumbers bid for the work, one fifty dollars less than the other. Of course the cheaper man got the job; he also got through with it very quickly. Upon the face of it he did good work. The basins, fittings, and so on, were trig and true. No water dripped

from any faucet, and the pipes, so far as they were visible, bore every test. Notwithstanding, the house was haunted. Sewer-gas odours rose up in the most unexpected places. Inside six months the bath-room and closet were pulled up three times in the effort to find the leak, without discovering anything amiss. Then, providentially, something got wrong with the tubs. In taking up the floor under them, it was found that a space of six inches in the main house-drain had no regular pipe, but had been temporarily closed in with a sheet of bent tin. A workman hurrying to finish up the job had put in the tin rather than go back to the shop for a piece of pipe lacking. First and last, the householder paid something more than a hundred dollars for the fifty-dollar saving, besides risking life and health, and enduring much discomfort.

Good Plumbing

Perfect plumbing requires three separate sets of pipes, all running down into the main house-pipe which connects with the sewer. First, there are leaders for rain or snow water. Commonly they run outside, or are partly incased in the wall. Corrugated metal is better than smooth for them, since, if they fill and freeze in bitter weather, the rough pipe bears the strain better than the smooth. Next come the waste-water pipes, draining baths, sinks, and so on, and, last and most important of all, the soil-pipes, which carry off the wash of closets and urinals.

Leaders begin at the roof just well under the eaves. Waste and soil pipes run up several feet higher than the roof. Otherwise they would be a menace, and fill the house with sewer-gas. To each of them there is attached a smaller pipe, whose use is to secure what is known technically as back-ventilation. It goes out from the pipe below the lowermost plumbing fixture, and comes back into it above the highest. All along it is joined by other


SOIL
ATTIC JOISTS
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LEADER
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BATH-TUB
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VENT
2nd FL. JOISTS
SINK
1st FL. JOISTS
GRATING
LAUNDRY TUBS
SOIL
TRAP
AIR
AIR
MAIN LINE TO SEWER
RUNNING TRAP
TO SEWER

small pipes, one from the crown of every trap. Thus, when a trap is flushed, the air in the pipe underneath does not struggle and gurgle through the water and finally pass into the room, but is forced easily downward before the flush-water, followed by clean air from the pipe in the crown.

All this is easily demonstrated practically. Fill a tall narrow bottle with water, turn it upside down, and watch the struggle of air and water as it empties itself. Refill it, again invert it, then break it slightly at the highest point. As soon as the break admits air, the water drops out magically without a gurgle or splash.

The best plumbing means that which is simplest, straightest, and least. The nearer the three sets of pipes come to running directly up and down, the better for health and purse. These are the pipe materials in their order of desirability: Lead, brass, wrought iron, galvanised iron. In all cities of the first class the use of earthen pipe inside a building is strictly forbidden. In New York no earthen pipe may be laid nearer than ten feet of a house-wall. Whatever the material, pipes should take the shortest course possible. If they run in any place horizontally, it is imperative to have them so supported that sagging is out of the question. The least small sag means a potential leak and plague-spot. This is especially true of the main house-pipe—the horizontal pipe into which the others empty, and which finally takes the house-waste into the sewer. This should have a fall of at least a quarter-inch in the foot. If storm-water is led into it outside, the area drains should be as carefully trapped as any other.

A most important adjunct of the house-pipe is the fresh-air pipe. Most commonly it leaves the house-pipe just inside the house-trap, which is placed close to the cellar-wall, and runs up and out, to reach open air, ending maybe a foot above-ground with a proper revolving-cowl.

But in the best and newest plumbing systems the fresh-air pipe runs to and through the roof, going a little higher than the end of the soil-pipe. Thus the flow of air through the pipes is sensibly augmented and made purer, yet all danger of fouling windows, either low or high, is done away with.

Traps

Traps are the vital points of all sorts and conditions of plumbing. The S-trap in some shape is now all but universal. The end and aim of a trap is to bar with a water-seal the entrance of sewer-gas, which is more properly sewer-air. Upon this point there is a lively dispute. Some of the wise men say there is a specific toxic exhalation from sewage, others that sewer-gas, so-called, is only air tainted with sulphuretted and carburetted hydrogen, carbonic acid, and various gaseous products of decomposing human waste.

But let nobody be lulled into false security. Every inch of inside pipe-surface shelters countless millions of bacteria, harmless so long as use keeps the pipes wet, but ready for deadly mischief as soon as the pipe dries. Hence the importance of flushing daily unused fixtures. Hence, too, the danger in occupying a house disused or closed without the most thorough flushing of all plumbing, and at least a twenty-four hours' airing. The very first thing to do when preparing to occupy such a dwelling is to set a short bit of candle upon the cellar-floor, and see how well it burns there. If it goes out inside an hour, open all doors and windows, start fires, and do whatever else is possible to set up a brisk circulation of air. Long-escaped sewer-gas divides itself, the light ill-smelling hydrogens going into upper air, and the heavy carbonic acid sinking. This stale carbonic acid has no distinct bad smell, but rather one lifeless and stifling. It is, in fact, identical with the "choke-damp" so fatal in coal

mines. Mixed with other lighter gases it becomes fire-damp, and may explode with more or less force if brought in contact with flames.

Harking back to trap-seals, the water-seal is the water which, after flushing, remains in the lower bend of the S, standing well above the projection, and thus permitting nothing gaseous to escape. This seal may be broken in several ways. Evaporation is one of them; therefore a trap standing in a very warm place must be flushed at least twice a day if not in use. Siphonage is another way. A third is too great a head of water, especially if the water carries along considerable solid matter. Thus laden it sometimes sets up suction strong enough to draw the water-seal over the bend of the trap. In the same way water poured from a considerable height may have force enough in flow to take the water-seal along with it.

Testing Traps and Plumbing

If the plumbing of a house or apartment is not above suspicion by either eye, ear, or nose, insist upon a test of it before taking possession. In cities law compels landlords to make such tests upon demand. House-owners do not need such compulsion. No person sane and sensible wilfully dares the dangers of futile plumbing. Testing is neither hard nor easy. For a whole system of pipes, there is but one thing infallible—the smoke test. To apply it one must have recourse to a master plumber, who is usually provided with special apparatus for forcing smoke into the house-pipe, but keeping it wholly out of the house. If it betrays its presence, even in the slightest, inside, then the pipes need a looking after of the most thorough sort. The smoke is specially acrid and pungent, so it cannot possibly be mistaken for any other odour. But where it goes, sewer-gas can follow. Commonly it has preceded the smoke, so the house should be well aired

before one stays in it even a few hours, much less undertakes to live in it.

Next to the smoke test comes the peppermint one. Get a four-ounce phial of peppermint essence, take care not to unstop it, nor let the least taint of it get abroad inside the house. Close bath-room doors, closet-lids, and fill every trap full of water. Then go upon the roof, open the bottle, pour the essence down the soil-pipe, and follow it instantly with a gallon of boiling water. Stay upon the roof half-an-hour so as not to take back the peppermint smell inside. Let another person go about at the end of fifteen minutes, and sniff carefully at all the plumbing fixtures. If there is a flavour of peppermint, it is a case for the plumber. If no odour is perceptible, every trap is doing its whole duty.

Where a single trap is suspected, pour peppermint in a higher one, holding the bottle inside a cloth, and spreading out the cloth over the trap-mouth so the smell shall be closely confined. Then stand beside the suspected trap for a few minutes, and note if the peppermint smell comes out of it. In testing a sink thus, put the peppermint in a big thin glass-bottle, one big enough to cover the sink-grating, stop the bottle very tight, set it over the grating; then spread the cloth over the whole sink, stretch a hand under the cloth, and break the bottle upon the grating, leaving the top to cover the opening. Open doors and windows for a minute, close them, go away, and stay half-an-hour. If upon returning the peppermint smell is strong, especially around the trap underneath, something is in need of immediate attention.

This is the way to tell whether or no a trap holds its seal properly. Pour in a gallon of water very gently, and after five minutes mark how high the water stands in the trap. Then flush it quickly and forcibly with the full head of the cistern. When the water is again still, see if it reaches the mark. If it does, the trap is working

right, but if it is even a half-inch lower, there is danger ahead—danger demanding the instant services of a competent plumber.

To test a trap for sewer-gas, hold a long lighted taper just over the water as the trap is flushed. If the flame is drawn slightly downward, the plumbing is properly ventilated; if it flutters sharply upward, sewer-air is rising through the flush-water. The taper flame, of course, will burn up; one must judge by any fluttering and swirling, such as would be occasioned by little currents of air. Where a slow, steady escape of sewer-air is suspected, try the candle test. Put a bit of lighted candle in a very low candlestick, and set it in the closet, either on the floor or close beside the trap. Leave it undisturbed for three hours, keeping the bath-room door shut tight all the time. Any considerable amount of sewer-gas will bring in enough carbonic acid to settle and put out the flame.

Another test, especially valuable for sink-traps and screened traps in general, is that of a silver spoon. Rub the spoon as bright as possible, then keep it for twelve hours close to the place suspected. Even a trace of sewer-gas will blur and begin to tarnish it. The flame test also applies in such cases, though less certainly, as the screen or grating deflects and breaks up the flow of escaping gas.

Proportion in Plumbing

Open plumbing is a boon little short of light and air. It enables one not merely to see the sort of traps used, and their location, but to make sure that proportion is properly observed. Proportion is all-important for many reasons. The chiefest of them is that a pipe too big for the water-flow is never properly scoured. Right here it may be well to set down that a four-inch pipe requires not twice but four times as much water for clean scouring as does a two-inch one, and, further, that friction, which

is the retarding influence in scouring, increases in the same ratio. Too big a trap is particularly dangerous. Unless every drop of dirty water is forced over, leaving the water-seal clean throughout, the trap becomes a miniature cesspool, in which waste matter continually decays and poisons the atmosphere. No competent nor decently honest plumber, much less one with a shred of conscience, thinks of using a trap bigger than the pipe it drains. But since there are in all trades artisans not over-burdened with either knowledge or scruples, it is well to take every chance of knowing the right thing, so one may insist upon having it.

Perfect flushing, which is the end and aim of good plumbing, requires a quick, steady flow of sufficient volume to wholly fill the pipe. Two gallons of water delivered in five seconds are far and away more effectual, both in moving waste and in cleansing pipes, than five gallons dribbled down through a minute. Yet a flow too violent is even worse than one too sluggish. Water falling down carries always the momentum of the whole head; thus a single gallon coming with great impetus may curl through and over the trap, leaving behind it a most insufficient seal.

Care of Plumbing

Every closet in daily use should be flushed once a week with at least two gallons of boiling water. Every other week a gallon of copperas water should be poured into it, and alternately with the copperas water a gallon of chloride of lime. (See Chapter on Disinfectants.) Use plain lime-water if no chloride is at hand. Monthly, but not oftener, dissolve a pound of washing-soda in a gallon of boiling water, pour the solution into the closet, let it stand fifteen minutes; then flush the closet with the full head from its own cistern, and follow with a gallon of

clear boiling water. The soda-water should stand in the trap just long enough to clean it thoroughly, but must be washed and rinsed away, so it may not attack and eat out the lead of the pipes and the solder of the joints.

Keep sinks clean in the same way, only use the soda solution fortnightly, and let it stand longer in the trap, as the grease will protect the pipe. Still, be sure to wash it out thoroughly. Plain clear lime-water is better for a sink than the chloride, which smells to heaven, especially in a small or ill-ventilated room.

To clean the traps underneath set bowls, put half a pint of ammonia to the gallon of soda solution. Twice a year at least put in the plug, fill the bowl to the brim with the ammoniated soda, and let it stand until the solution is level with the waste-vent. Tie a bit of absorbent cotton strongly upon the end of a coarsish crochet-hook, and, with the swab so formed, wash out the vent holes as far as it will reach. Use the same sort of swab to clean the drains of bowls, bath-tubs, and so on. The cleaner and freer running the vents, the better the sanitation.

Scour brass faucets with tripoli mixed in oil; clean silvered ones and all silvered fittings with whiting mixed to a paste with alcohol and ammonia. But in scouring all sorts of fixtures, be extra careful about keeping the scouring-grit out of the joints. Even the finest particles quickly cut away screw-threads turning many times a day. After scouring, also take care to let the water run a minute before catching it for use. Do not wash very sandy things, as spinach, potatoes, turnips, or radishes, under the faucet, but in a big pan—at least for the first water. In emptying the pan, let the water run off, then empty the sand at the bottom of it among ashes or garbage. A teaspoonful of sand washed down a lead-pipe wears and scratches it more than a whole hogshead of water.

Abuses of Plumbing

Those gentlemen, the plumbers, should build a statue to the goddess of Carelessness; that is, supposing such a deity sits in any pantheon. Certain it is, careful common sense will rout the plumber and his bill, the most dreaded of household spectres. Wise men have been studying this ever so long, to devise plumbing that would take care of itself. They have not succeeded, nor are they likely to do it. At least not without a revolution in mechanics whereby the tendency of fluids always to seek their own level is eliminated, and other things equally wonderful brought to pass. So long as physics remain nearly static, so long will it behove those who dwell in modern houses not merely to know all about their pipes and traps, but to look well to their usage.

In the care of plumbing, more than almost anything else, there are no trifles. A bit of rag; a string, a burnt match, or a wisp of hair from the comb, seems a very little thing; one that the pipes can carry off with no possible strain. Wait a bit. The rag or the string hanging over the bend of the trap may make itself a siphon to empty the water-seal—the water-seal which is the household defence against the deadly sewer-gas; and the rag so caught may keep on doing it unsuspected, week after week, until death and disease are rampant. If a faulty trap in a big country house had but been a little more faulty thirty years back, King Edward VII. would never have sat on the English throne. Scarlet, typhoid, and typhus fevers, diphtheria, and various other ailments, are all specifically " filth diseases " bred in nature's mysterious processes of making wholesome again human waste.

Match-ends ought to float away harming nobody, but are ever so much likelier to be caught by some eddy of flush-water, jammed into a crevice, and there take to themselves other solid particles until they form a clot of decay,

alike offensive and dangerous. Still, in the matter of mischief-making, nothing quite comes up to the wisp of hair, which quickly forms itself into a sort of strainer, catching and holding stuff that should pass by. Worse still, it commonly lodges in the most inconvenient place, hanging fast to the least roughness or the tiniest projection inside the pipe, and at last by accretion clogging the whole space. Hair has a most special affinity for bits of soap. Solid soap is another thing to be religiously kept out of pipes. Even very strong soap-suds do harm unless followed at once with a flood of clear water, preferably hot water.

Either coffee-grounds or tea-leaves will clog a sink-pipe. They will also wear it out very quickly. This partly by mechanical means, partly by chemical ones. Drain both very dry, and throw among ashes, unless the tea-leaves are kept for sprinkling carpets before sweeping. In a sink-pipe, even though all grease is kept out, they breed smells. Then in the sewer, where grease is inevitable, they will cake and clog distressingly, often to the point of making necessary a costly and troublesome unclogging.

Every kitchen should have its grease-can for refuse fat of every sort, even the scrapings of greasy plates and dishes. Empty this can twice a week in winter, every other day in summer. Let greasy water, as from boiling hams or corned beef, cool thoroughly, and take off the grease before pouring the water in the sink. All greasy vessels need to be rinsed with hot soda-water before washing. Let them stand some little time after the water is poured in; thus the grease becomes in a measure saponified, and is less apt to stick to the pipes, or cake upon top of the trap.

But neither grease, strings, nor tea and coffee grounds are the worst things plumbing is called on to encounter. Many careless folk do not scruple to throw into a closet

such things as grape-skins, cherry-pits, nut-shells, and carpet-sweepings. The last are the worst. Persistence in such practices means disease and a big bill for repairs. It may be accepted as axiomatic that nothing should ever be thrown into a closet that it is feasible or even possible to dispose of in any other way. Under no circumstances let anything go there that water will not dissolve. Pipes are made to carry off liquids and only such solids as may be reduced to a fluid consistency.

Location of Plumbing

Let the pipes run straight up and down, with as few laterals as possible. This is the first commandment. The second is like unto it—beware set bowls and special far-off baths. Even though portable baths are less convenient, they are ever and ever so much safer. No amount of money, nor the most sleepless vigilance, can insure that plumbing shall be perfectly safe all the time. So for delicate people, old people, and little children, it is almost imperative to provide sleeping-rooms that have no sort of connection with the plumbing anywhere.

There may well be a bath-room upon every floor, with water in a dressing-room back of or beside it. This lets the main pipes keep vertical. But be sure the drains of the bath-tubs do not go into the soil-pipes unless they have double traps. Be surest of all that there is no connection whatever between the flush-tanks of closets and the main water-supply. Of course there is bound to be a supply-pipe, but it must be so valved no taint can creep from it to the water. Waste-pipes from sinks must run separate from soil-pipes clean to the house-drain. If there are two sinks, as in kitchen and scullery, or pantry, it is well to have one several inches lower than the other, and the lowest set nearest the join with the house-drain.

Nursery Sinks

Keeping nursery sinks clean and sweet is among the hardest problems in the care of plumbing. Milk, or milky water even, in small quantity daily, fouls pipes enormously, and breeds a most evil smell. That is unless the milky water is followed almost instantly by a flushing of hot soda-water, and at least once in three days is supplemented with a lime-water flush. Sea salt in the lime-water, a big lump to the pailful, makes it more effective. Heat it almost to boiling, and follow it in a quarter of an hour with clear hot water. This should keep the sink without odour unless very dirty water, as from washing napkins, is also poured into it. If possible, the nursery sink should be supplemented with a nursery closet and two small porcelain tubs. Clean the traps to all as directed for the sink. Nursery waste is in many ways the most offensive of all, and the hardest to get rid of.

Other People's Plumbing

In settling upon a home, one needs must look out for other people's plumbing. Surroundings often mean health or disease. When choosing an apartment, especially in a tall house, look out of the windows first thing. If soil-pipes upon lower adjacent buildings discharge just beneath the windows, let the apartment alone; it would be dear if one were paid to occupy it. Beyond all this, a ramshackle next-door neighbour may let loose enough sewer-gas to permeate the house-walls either side, and so make dangerous a new and trig erection. Then there are various manufacturing plants whose vicinity it is wise to avoid. These are among the most undesirable works: Alkali, brick, cement, brass, copper, iron, ammonia, and India-rubber. Each and several they poison the air around for at least a block. While they may not be so

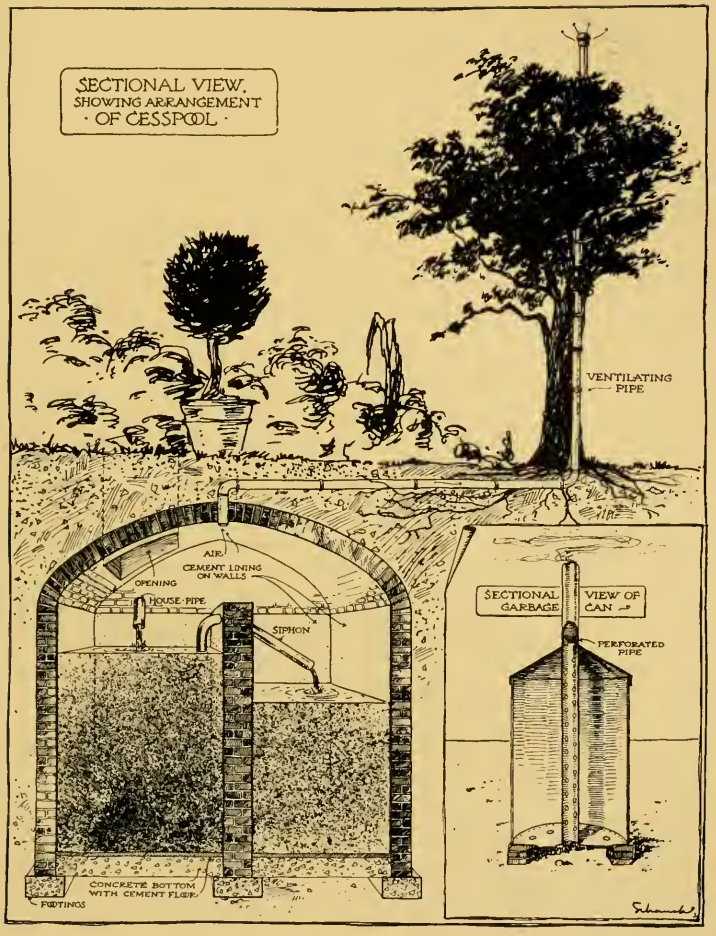
nauseous as match factories, glue factories, bone-burners, and slaughter-houses, they are fully as unwholesome. Upon general principles it is the part of wisdom to keep away from any sort of neighbour that sends out clouds of dust and smoke.

Cesspools and Earth-drains

Modern improvements often exist away from sewer systems. As to whether or no such existence is wise, each householder must personally decide. But it admits of no debate that the proper disposal of refuse is something to be well considered. With space and sand enough, the problem is not a hard one. A porous brick cesspool, laid unmortared in sandy ground and cleaned out twice a year, will do no harm to anybody, besides proving itself a very great convenience.

It must be used with judgment. Wash-water must be kept from it. Indeed, the whole inflow must keep some relation to the potential percolation. A cesspool six by twelve feet, with a mean depth of nine feet, and a division wall of brick across the short way of it, should be able to take a waste of ten gallons the head daily from a family of six persons or even eight. Set a syphon on the house-pipe side a little way below the top. The top should be bricked over arching, then covered with a foot of earth, and well turfed. At cleaning-time roll back the turf, make a good big opening over the inner compartment, and throw into it a bushel of quicklime. The steam from the slacking lime will bring up the foul air, and make the work of cleaning safe. It will be, further, much less offensive if, after the lime, a bushel of fresh charcoal, broken small, is also thrown in.

Cesspools in heavy, holding clay soil will be ever so much better for a ventilating pipe. It should run from the crown of the arch, but may be a little underground


SECTIONAL VIEW,
SHOWING ARRANGEMENT
· OF CESSPOOL ·
VENTILATING PIPE
AIR
CEMENT LINING ON WALLS
OPENING
HOUSE-PIPE
SIPHON
CONCRETE BOTTOM WITH CEMENT FLOOR
FOOTINGS
SECTIONAL VIEW OF GARBAGE CAN
PERFORATED PIPE

until it comes to a tree, or tall post, up which it should be carried to a height which will insure against contaminating the air about the house. Such a pipe is almost a necessity where seepage is slow, as the cesspool liquid remaining stagnant is apt to give off gases in quantity, and thus there may be explosions. In all cases where cesspools must be constructed in heavy soils, it is worth a considerable outlay to provide a drain. If the liquids can be led away to a safe distance, and the ventilating pipe established, cleaning will not be needed oftener than once a year, or, where the amount of waste is small, once in two years.

Privies and earth-closets can be kept reasonably inoffensive by throwing in a shovelful of quicklime and another of dry earth whenever they are used. Vaults of either need to be cleaned at least fortnightly. A light iron-hooped barrel sawed in half, and each half furnished with handles, makes excellent receptacles for the filth and dry earth. Two of these half-barrels, set in a shallow, well-walled vault, can be moved, emptied, and replaced easily and quickly. Work expeditiously, and bury their contents in clean earth wherever it is possible, so Nature's fine alchemy may make clean what is unclean.

Do not throw liquids, such as slops, dish-water, and soap-suds, upon the ground close about a dwelling. Provide a drain to take them away. The cost of it need be only a day's work and some lengths of tarred boards. Nail the boards together V-shape, and lay them point up at the bottom of a trench a foot wide, two feet deep, and sloping toward some sort of outlet. The sharper the slope the better, unless it is so steep earth will not stay in it. Lay stones upon the boards to hold them firm, and break the joints with shorter boards. Pack earth firmly over them. A drain so made will last for years, and take off a surprising amount of slops. At the drain-mouth set a length of six or even eight inch tile, slanting a little way

from the drain-course. Over this tile fix a tin or wooden hopper, with wire-net or perforated tin in the bottom. This to strain the slops, and save the ditch from clogging. Once a week scald out the wooden hopper, though, as it is likely to stand fair to the sun, it will hardly prove dangerous no matter how dirty.

The kitchen may have a sink-pipe emptying directly into such a drain. But the end of the pipe should be at least a foot from the hopper, so it may not lead bad air back into the kitchen. If the drain is fitted with six-inch tile, it may take away storm-water from the leads, with advantage to itself and the premises. It may, further, carry off wash-water, which, with only the boards, is apt to prove too much for it.

Waring's Bacterial System of Country-House Drainage

The late G. E. Waring, who may be called the father of open plumbing, hated cesspools and all their works. To take their place and do their work, he devised a drainage system which, given reasonable care, is as sanitary as it is simple. To understand its workings, it is necessary to know some things regarding sewage and the bacteria bred in it. Ordinary household sewage, including bath and wash water, contains in the thousand parts—998 of water, 1 of mineral salts, and 1 of refuse organic matter. It is this organic refuse which alone is fouling. If it can be decomposed before putrefaction, it is no longer dangerous.

To secure this decomposition it is only necessary that the sewage be exposed in thin films to the action of light and air. The air, the earth, the sewage itself, abound in bacteria, which attack the waste matter, tear it apart and oxidise it, the carbon, hydrogen, and nitrogen of the

waste combining with oxygen from the air to form carbonic-acid gas, water, and nitrous and nitric acid. The more perfect this oxidation, the purer the sewage-water becomes. It has been demonstrated over and over, by various filtration plants, that very foul sewage could thus be brought back to the condition of distilled water.

By the Waring system, all the household waste is led by pipes to a tank, either wholly or partly sunken, and open at the top. The tank must be either of brick, well set in cement, or glazed and tightly cemented, or of marble slabs. The smoother and more impervious, the better. It is two feet deep and twenty inches broad. The length is any multiple of two feet—four, six, eight, ten, or twelve —according to the flow it must receive. Four inches below the top, on the inside, there is an inch-wide shoulder in the side walls. These shoulders are to support wire screens, made in two-foot sections, strongly framed and easily removable. At the inlet end of the tank there is a recess fifteen inches square. In this a movable cage of wire-netting fits snugly. The cage is closed upon three sides with a ten-inch opening upon the fourth. The inlet runs into this opening, thus enabling the cage to strain out paper and all clogging solids. The cages are supplied in duplicate, so as to be removable for cleaning and airing. Their contents after turning out should be immediately dug into the earth, or covered with fresh earth if digging is impracticable.

The tank slopes a little toward the outlet end, which is fitted with an automatic siphon, discharging every twelve hours or twenty-four, according as it is proportioned to the inflow. From the syphon the waste water goes through drains, either surface or sub-surface, and leaches slowly into the soil. The drains must be so arranged that the flow reaches them in succession. Usually there are three sets, used consecutively. This consecutive use is the pith of the whole matter. It permits the drains and

the soil about them to dry out, giving the beneficent bacteria time to do their work. The drains must be so arranged that the flow is very gradual. It is, further, imperative to provide a light, well-aired surface-soil round about them. The ground they run over is best deeply underdrained. If it is warm, sandy, and very thirsty, underdraining may not be necessary, but with heavy loam or holding clay, it is indispensable. Surface drains may be simply gutters of finely broken stones or clean pebbles running between turfed banks, and returning one on the other if limited space or soil configuration demands. They must have barely enough slope to set up and maintain a sluggish current. This is also true of the tile drains; if the slope is too sharp, there may be unpleasant springs and fountains of sewage toward the bottom. Tile should be laid just below the grass-roots, either in earthenware gutters or upon beds of finely broken stone. All this, however, the sanitary engineer may well look out for. In use the tank should be uncovered at need—in hot weather, daily, the cage removed and cleaned, the walls swept down, and the mouth of the discharging siphon especially looked to. The tank's location will, of course, be determined by the size and configuration of the grounds. It may be screened by planting a shrubby evergreen ring about it. The ring should, however, not be so close as to impede sunlight and the circulation of air. Since sewage putrefies but slightly under twenty-four hours, and is seldom offensive before putrefaction, there is not much reason to fear ill odours unless the tank is very greatly neglected.

In light, well-aired soil it is estimated that one foot of pipage in each of the three alternating lines is sufficient for each gallon of tank-capacity. With a cold clay loam, three feet of pipe will be required to take up the same amount of flowage. The gates for securing alternate flowage must be strictly looked after. Where this is done,

the system is among the best yet devised to counteract the defilement of habitation.

Rubbish and Garbage

Fortunes have been lost and found in dust-heaps. Lives also are lost through them every year, in spite of modern progress. Indeed, it is not too much to say that every carelessly managed ash-heap or garbage-pile is a potential poisoner. City folk have little concern of this sort; the city itself takes away garbage daily. The lesson of such taking away is one the whole people may well lay to heart. If, through storm or stress of weather, collection is clogged and garbage accumulates, there is an instant and perceptible rise in the cases of "filth disease," and a corresponding increase in the death-rate.

Wherefore it is well to impress this golden rule for dust-heaps. Dust, be it understood, is a generic rather than a specific term, and, as here used, applies to whatever is thrown away. Wherever it is possible, waste should be turned to ashes. Things which cannot be burned need to be dried, and kept dry. Concretely applied, this means burn paper, especially greasy paper, or dirty card-board of every sort, rags, straw, excelsior, hair, lint, carpet-sweepings, feathers, bones, and old leather. For the most part the burning can be done in a stove, or grate, or range, especially if one is wise enough to burn up things right along, thus preventing cluttering. But where the stove or range is out of the question—as when gas or oil is the fuel—it pays to make things burn themselves in a crematory that any tinsmith can make at a very low cost.

The foundation of it is a tall galvanised-iron garbage-can. Have half-a-dozen inch-holes cut in the bottom of it well toward the edge, then inside the ring of holes have a length of perforated iron pipe riveted on. It should

stand several feet higher than the cover, and be perforated from the bottom upward, nearly to where the cover touches it. The can-cover must be cut in two, and each half so hollowed as to fit around the pipe. It may be hinged at one end, and fastened with a hook-clamp at the other. In use set the can in a vacant space outdoors, supporting the bottom on bricks, and piling the brick high enough to get the hand well underneath. Put whatever is to be burned inside, between the pipe and the can, close the cover, then touch a match to it through one of the holes in the bottom. Such things as leather and bones need to be mixed through lighter stuff, which in burning will set them well afire. If there is sufficient garden space, it is better to bury the leather and bones two feet down, where the roots of a choice plant can reach them. But with only a little plot, maybe in grass, the ashes from the can, which are among the very best fertilisers, will be handier and more valuable.

Fruit-skins and pits, potato-skins, pea-hulls, beet-tops, the refuse of salads, indeed, every sort of vegetable waste, ought to be spread out thin and dried through and through before going in the dust-heap. Where a horse, or cow, or goat, or even a pig, is kept, such things will give little trouble. A thrifty pig, indeed, may be made a sort of savings bank for all sorts and conditions of waste edibles. It is the same almost with fowls, which will eat up almost every sort of table-refuse clean with only a little care in preparing it for them. Still, when all is subtracted, much remains that perforce goes to the heap. But never by any chance let a dust-heap get either wet or greasy.

Grease of any sort had better be turned into soft soap. (See Chapter on Insecticides.) Water is the life of bacterial action. Harmful or harmless, those mysterious creatures depend upon moisture for multiplication. Keep some sort of shelter for the dust-heap. Do not build it

upon the ground. A big box with a light, tight, movable gable-roof, and a narrow door toward the bottom, is a good refuse-holder. So is a light barrel, with a batten cover, and swung between two posts so it can be easily emptied. If skins and stalks are burned after drying, the box or barrel will need emptying about every six weeks. If the stalks go in in bulk, it should be emptied fortnightly. Weekly it should have a quart of quicklime and a handful of broken charcoal thrown into it. Thus treated it may stand behind a light trellis at the very edge of a flower-bed, or border, and never in any way betray its presence.

Cabbage-leaves, potato-parings, and their ilk, massed together in the natural state and left to decay, will breed pestilence nearly as quickly as animal waste. If such massing is unavoidable, the heap should be mixed with quicklime and charcoal, and sprinkled daily with copperas in powder. If the stench is overpowering, drench the whole heap with a strong chloride of lime solution, or dissolved permanganate of potash. Covering decaying stuff with clean earth is always advisable. The trouble is that in so many cases there is no clean earth at hand.

Fine ashes help to keep the dust-heap wholesome. Cinders had better be sifted out, and saved to help in draining paths. A layer of cinders six inches deep, beneath a three-inch coat of either shells or gravel, will help to keep a path free of grass and dampness. But, while the cinder-gathering goes on, do not keep them in an unsightly pile plain to view. Boxes and barrels are to be had almost anywhere for the asking, and use of them makes for so much that is desirable in a home.

Chapter *THIRTEEN*

The Water-Supply

NO other single factor in household arrangements is so vital to health and comfort as the water-supply. Good water is assuredly among the best gifts of nature, bad water the source and breeder of uncounted ills. Paradoxical as it sounds, the purest water is by no means always the best. Limestone water, for example, builds up the bones in growing animals, children not excepted; further, it is to the carbonic acid held in solution that spring water, indeed, any fresh and living water, owes much of its charm. Distilled water is notoriously flat, and unpalatable. So is boiled water, yet boiling renders water which is not above suspicion reasonably safe. Boiling drives off the carbonic acid quite as effectually as it kills deleterious germs.

Hard Water and Soft Water

Water is formed of oxygen and hydrogen, chemically combined, yet has the curious property of taking to itself more oxygen mixed with nitrogen in the form of air. This in addition to the carbonic acid, of which water commonly absorbs about its own volume. All chemically pure water is soft. Rain-water is not quite chemically pure, in that it absorbs traces of ammonia in falling through the air. Distilled water received in sterilised vessels is the only strictly pure water. But the constant

drinking of distilled water would be neither wholesome nor pleasant.

Water has a strong solvent power, somewhat proportioned, however, to its purity and the amount of carbonic acid it carries. For practical purposes, rain-water, the water from mud-bottomed ponds, marshes, and streams running through sands neither salt nor alkaline, may be accepted as soft. What is known in country parlance as "freestone water," though less hard than limestone water, is not soft, carrying as it does a sensible percentage of mineral matter derived from granitic rocks and soils. This mineral taint is, however, so inert it rarely gives trouble. It is the water well charged with carbonic acid, and flowing over or through either limestone, chalk, or gypsum formations, which dissolves enough of active mineral salts to need softening treatment.

Pure limestone water is eminently wholesome for drinking. But in the laundry it is another proposition. The lime in the water combines with the soap, making hard, curdy flakes all over the surface of it. Until the lime has been neutralised, indeed, it is impossible to make good suds; and, even then, the curdy deposit makes trouble upon the wash and the tubs. Wherefore, with any water which sets up this curdiness, it is the part of wisdom to soften each tubful as soon as drawn with either a cupful of lye, made from wood-ashes and strained, or two tablespoonfuls of a strong pearl-ash solution, or a pint of hot soda-water, strong enough to slip between the fingers. Of course either soda or pearl-ash can be used in the lump, but the action is not so quick, nor anything like so even and so effectual.

Boiling also throws down the lime; hence the scurvy, whitish deposits at the bottom of tea-kettles and boilers. Clear lime-water in proportion of one gallon to ten softens very hard water—possibly on homœopathic principles. It is the best of re-agents for drinking-water and for that

which must be used in cooking, as well as for washing delicately coloured fabrics.

Water, either soft or hard, dissolves lead; in small measure, to be sure, but enough to count in the long run. Hence the importance of letting water run some little time from the pipes before using it either for drinking or cooking. Where water from the pipes is turbid, or even slightly muddy, it is a good plan to strain it by tying a small bag of coarse loosely woven flannel, very strongly made, over the mouth of the faucet, and changing the bag daily. In washing this does much to keep the clothes white through seasons of bad water. Wherever there is a city or village water-supply, such periods may be counted on some time in the year.

Springs, Wells, and Cisterns

With a municipal water-supply the most one can do is to modify or minimise evils. But in more than half the homes of these United States the water-supply is absolutely subject to control. More's the pity, one is tempted to say, recalling many prevalent practices. Very nice people, and wise upon many points, are too often shockingly careless of possible taints. Apparently they think the earth is a great all-potent filter—whenever water goes through it, it leaves all traces of impurity behind. Nothing could well be more mistaken. The earth *is* a filter. Indeed, it is safe to say that throughout the unreckonable ages every drop of water on the planet has been fouled and made clean many times over. But the making clean is a tedious process—much too tedious to be trusted, with life and health in the balance. It cannot be said too often nor too strongly that there is no alchemy in earth or gravel potent to remove the taint of decaying organic matter, either animal or vegetable.

No well sunk in a populous space yields water above

suspicion. That is, excepting always artesian wells, or driven ones that go down several hundred feet, and are securely piped against the infiltration of surface-water. Something also depends upon the soil. Sandy earth permits the surface taints to go down very much deeper than clay. A stiff, holding clay, indeed, will give water less contaminated sixty feet down than will a sandy loam at the depth of a hundred. Neither clay nor sand extends anything like so far below the surface; but all the water in water-veins at some time or other falls upon the surface in the form of rain or snow, and seeps gradually down through the upper soil. Sandy soils are so much opener, the passage through them is more rapid; besides, the sand particles do not catch and hold ammonia and its compounds as do the particles of clay.

Water from what is known as a seep-well—that is to say, water gathered from the inflow of many tiny trickles—is almost sure to be polluted, unless the surface about it is fairly virgin. If much surface-seepage is encountered in well-digging, the shaft should be abandoned, and a new location chosen. The perfect well is one going down through clean firm soil to a depth of at least forty feet, and there piercing a water-vein bold enough to fill the well-bottom to a depth of ten feet, but seldom rising above that. If the vein flows just upon top of a rock-stratum which can be blasted to provide a deep, clean rock-cup, then the location is ideal.

But have a care whence such a vein flows. If there is a graveyard, even a small one, lying higher than the well-seat anywhere in the vein's water-shed, the well cannot be too quickly filled in and abandoned. Graveyards are among the deadliest of all well-poisoners—a fact that is in itself a very sufficient argument for cremation. If there are stables, or slaughter-houses, or greenhouses, or even highly manured market-gardens, over the vein's gathering territory, the water will very likely be bad.

Leakage from sewers, cesspools, surface wash from privy vaults, or drains carrying away household slops, are all things to be well looked after. But all such things may be disregarded if a well is sunk through a stratum of sound rock to reach a water-bearing formation lying below.

Any sort of well should have a rock or brick wall laid in cement, and cemented all over the inner surface. A cast-iron pump, cement-bedded, with no cranny nor crevice for creeping intruders, will insure the water's keeping pure all the year round. It will further insure it against pollution from bad air—the choke-damp, which, heavier than the upper air, sinks into low places, and stays there until violently expelled.

In alluvial regions, or those thickly populated, cisterns are far and away better than wells. They may be under or above ground, preferably under, should be of suitable dimension, and bricked up from the lowermost cup to the arch. The arch should come a foot below the surface of the earth, and have a shaft, a foot and a half high, running up to receive the pump fixtures. All the inner surface of the brick-work, and the outer one as far as exposed, should be cemented, using the very best quality of hydraulic cement, which hardens under water. Have the pump set very tight in the top of the shaft, cover the brick arch with earth, and sod the space over it compactly. Provide a tin or earthen trough open at one end to catch waste water under the pump-spout and take it safe away.

The inflow-pipe may be short or long according to location. Where choice is possible, it is well to set the cistern several yards away from the nearest house-wall. The inflow-pipe should run to it below the surface-level, three feet down, if possible. It should be of vitrified brick laid in cement, and cemented smooth inside and out. Where the water comes into it, there should be a brick receiver, either square or round, cemented within and without, and

rising two feet above-ground. This must be big enough to hold a sufficient filter. The bottom of it must be level with the inflow-pipe, which should fall a little in its course to the cistern. Set a coarse grating across the mouth of the inflow-pipe, or, better, a double section of hollow brick.

For the filter, first cover the bottom of the water-cup with clean rolled pebbles, using none less than two inches through. The layer ought to be six inches deep. Upon top of it put a layer of hard-wood charcoal, broken to egg-size, and screened free of dust. This should be at least three inches deep, with three inches of small pebbles over the top. Then, by way of finish, put over the pebbles big lumps of charcoal mixed with massive rolled flints—so massive the plunging roof-water will not be able to displace them. A filter so made will be good for five years, after which it should be overhauled, the stones washed clean, and the charcoal renewed.

With very big cisterns and a tremendous inflow, it is easier to use the wall-filter. This is of porous brick, laid unmortared, so as to divide the cistern about equally from top to bottom. Then the cistern-shape should be a long ellipse rather than round. The inflow-pipe comes in one side the filter-wall, and the pump is set upon the other. Where much water is needed, so much that all rain-water must be stored for use, the wall-filter is almost imperative.

No matter where the inflow-pipe mouth may be located, there must be a movable pipe to connect it with the leads. Stout tin well soldered, in elbow shape, with rings for easy handling and an inverted hopper-mouth, is the best. It is equally important to have a waste-water way close beside the filter, through which surplus or undesirable storm-water may run off. Eternal vigilance is the price of the best cistern-water, which is far and away the best of all water for either drinking, bathing, cooking, or laundry work. Even a small roof-surface supplies

enough water of the right sort for a fair-sized cistern if it is properly husbanded.

Snow-water from the roof of a country-house is rarely objectionable, unless the snow has lain so long it has become smoke-tainted. In towns or suburban places keep out snow-water, and let no rain-water in, until the roof has been well washed off. If possible, catch no rain before November, nor after March. It is, further, important to consider the sort of roof. Painted or stained shingles will not furnish good water. Painted tin, after a rain or two, is perfectly safe. Steamed and sawed shingles, unpainted, need to be seasoned and rain-soaked a year before saving water from them. Tile roofs, slate roofs, and hard-wood shingles unstained, shed rain-water very nearly in the same condition it fell.

With a cistern, beware of house-haunting birds such as pigeons, martins, and swallows. Each and several they will foul gutters sadly, often trying to build in them, and always perching upon roofs to rest and preen. Swallows are least objectionable, pigeons worst of all. A cote all their own is no protection against their defilement.

A last word as to gutters and leaders. The very best heavy tin is none too good for them. See that they are properly put up, and of sufficient size. See also that, after severe winter weather, they are still true and in place. Wooden gutters should not be used even upon a barn, especially if the water of it is to be drunk by milch-cows. Whatever taint is in the water will be passed on to the milk. Yet such is the perversity of miseducated palates, cows, indeed, any animals, accustomed to bad water, will refuse to drink good water unless driven to it by thirst.

Wind-Mills and Force-Pumps

Almost the whole face of these United States is underlaid with a flow of pure water, at distances varying from

three hundred to fifteen hundred feet. Hence, wherever there is enough of enterprise combined with a little money, the question of a pure water-supply is easily answered. The first cost of driven or artesian wells is not great, and, once the well is down, there is an inexhaustible supply ever after. Nor is that all. American ingenuity and enterprise have so cheapened machinery, it is easily possible for persons of ordinary means to have modern improvements in their houses, by the help of a wind-mill and a force-pump.

Circumstances and location govern the cost, but in a general way one may estimate it at from three hundred to fifteen hundred dollars. The gain in comfort, convenience, and sanitary security is enormous—quite enough in the course of a single season to warrant the outlay. In many of the home industries, such as fancy dairying, rose and violet culture, and small-fruit growing, wind-mills and water have proved the corner-stone of success. If he is a benefactor who makes two blades of grass grow where earlier but one was possible, what shall be said of a contrivance which makes possible grass-plots and flower-beds, not to name bath-rooms, where before there were none?

Spring Water

Spring water knows no medium; it is either very good or very bad. According to authority, the standard for water is this: "Free from colour, taste, or smell; cool, soft, bright, well aerated, and wholly free from deposit." But even this must be accepted with a qualification. Spring water may show every characteristic named, yet be unsafe, if the stream gathers head in a marshy space, especially a marsh that receives, in times of high water, flood-water contaminated with either sewage or the wash of inhabited and highly manured lands.

Filtration through the various strata takes away smell and colour, yet may leave behind subtle poisons. A spring coming to light after channelling under cultivated fields is commonly something to let alone. Contrariwise, one breaking out boldly from beneath a massy bluff, or gathering its waters in untrodden wilds, is safe as it is refreshing. A landowner should always have respect to a water-source, and in clearing fields, or grading, or draining, leave it as nearly undisturbed as possible.

Some Water Tests

Here are a few simple tests which even the wayfaring summer boarder or sojourner may apply, oftentime to the saving of health. Put a pint of water in an earthen vessel—a flattish one is best—evaporate it quickly, and scrape the dish clean of any residue. If the residue is white and powdery, it means lime or gypsum, hence the water is hard but safe. A whity-green or whity-yellow gummy residue is suspicious. Burn it. If it turns black, giving out the smell of burnt feathers, the water is contaminated with animal refuse, and a likely breeder of typhoid.

Another test is that with permanganate of potash, a chemical which, when dissolved, gives to water a beautiful purple colour. Put the water to be tested in a white earthen cup, add a teaspoonful of weak sulphuric acid, stir with a bit of glass, and pour in the dissolved permanganate—the solution must not be strong—until the water in the cup turns a rosy red. Cover with glass, and set aside a few minutes. If the colour has faded, then add more permanganate. Very much contaminated water will bleach out the potash colour twice or even three times. Still, it must be remembered that traces of iron, or peaty deposits in water, will have the same effect as sewage. Where iron or peat taint is likely, test the water further

in this fashion: Fill a clean glass with it, add a little nitric acid, and one-fourth as much lunar caustic in solution. Shake all well together, then stir with a slip of clean glass. If the glass comes out only slightly milky or clouded, the water is safe; it has only the normal grain of salt to the gallon. But if the milkiness is pronounced, thick, white, and curdy, it means too much salt, which in turn means sewage contamination. The salt of food is commonly or, rather, chiefly eliminated in urine, and thus passed back into the water-flow. Water which bleaches out the permanganate, and afterward responds to the test for salt though only slightly, is apt to be fouled with stable refuse, or some other sort of animal waste, rather than sewage.

Purifying Water

The name of filters is legion. For the most part one may like them, each and several, for several virtues, without finding any which combines all. One that is cheap, good, and reasonably efficient, withal easily kept clean, is made thus. Get first a five-gallon earthen jar, and a length of drain-pipe big enough to fit the mouth of the jar. Cut some rounds of coarse loosely woven flannel three inches bigger than the end of the tile, make an inch-hem all round, and run in a stout drawing-tape. Tie this tape over the swell at the end of the tile, then set the tile over the jar mouth. Now lay inside the tile a cheese-cloth bag, big enough to cover the whole bottom, and filled with charcoal broken to the size of a small pea. Pour water in the pipe—in draining through it is well filtered. Change the charcoal bag every day. Scald and dry the bag out of use, and once a week empty the charcoal into a sieve, and pour boiling water well through it.

Water so filtered may be afterward boiled, and drank with safety, no matter what its original condition. Boiling alone drives off many taints, besides killing all manner

of bacteria. Since it also drives off the life-giving air and gases, boiled water ought to be poured at least three times from one vessel to another before it is drunk. The higher one vessel is held from the other, the better. Another way of making boiled water more palatable is to acidulate it very slightly with, say, a teaspoonful of lime-juice to the gallon, then at the minute of drinking add two grains of soda bicarbonate dissolved in a little water. This will furnish about the normal amount of carbonic-acid gas.

In times of flood, water of every sort is apt to show traces of mud. Draw it, and let it settle before attempting to purify it. Then, if there is an earthy or leafy taste, put in a little alum, say two grains to the gallon of clear water, and filter well. The alum will combine with the foreign matter which is slightly albuminous, and be rendered wholly inert, forming a precipitate the filter will remove. Clean, fresh oak-chips are an even better astringent than alum. Fill up the drain-pipe filter with them, using fresh ones every morning, and pour on water as fast as it runs through.

Water ill-smelling and covered with greenish scum may be made safe by this simple expedient. Tie a lump of quicklime as big as the fist inside a clean cheese-cloth, and lower it in a bucket of the water. In slacking, the lime will develop steam enough to run through the water, driving off all foul gases. As soon as it ceases to hiss and bubble, take out the lime, let the water settle half-an-hour, then skim well and pour off carefully, leaving at least two inches depth above the sediment. In travelling, especially in roughing it, one often finds water of questionable quality. A pinch of either magnesia or prepared chalk, well stirred into a glassful, may prove a help and safeguard. Let the water settle, and drink only two-thirds down. The slight alkaline taste will not be disagreeable. If possible to pour the water off the sedi-

ment, and mix it with a very little good brandy or whisky, it will be both more palatable and more reassuring.

If alkali water is encountered, dash it very lightly with some vegetable acid—vinegar, lime, or lemon-juice.

Stills and Strainers

There is one certain, if troublesome, remedy for the worst possible water-supply—the water-still, which can be bought for the sum of ten dollars. It is made both in copper and aluminum, and can be used upon either a range, a gas-stove, or oil-stove, or set upon a rude camp furnace of stones and clay. All it requires, indeed, is a flat surface sufficiently heated to boil water. The still is in three parts, and takes up hardly more room than an ordinary vegetable steamer. First, there is a broad flat vessel for the boiling water, with a condenser, also broad and flat, fitting the top of it. Above the condenser is the feed-water, which keeps the condenser cool, and, as the lower chamber is emptied, passes down automatically to supply the boiler. There is a pipe with a stop-cock outside the condenser, so water can be drawn from it without interrupting the distilling. All the care needed for such a still is to keep the feed-tank full, see that the heat is steady, and now and then to empty the condenser.

Brackish water, marsh water, or that from contaminated springs and wells, is made perfectly wholesome by distillation. The boiler should never be allowed to dry out. If the still is in constant use, empty the boiler at least twice a day. Three times is better. And once a day, preferably in the morning, free the boiler rim and bottom of all adherent sediment. If it is salt sediment it can be scraped off; if lime or any sort of mineral is deposited, remove it by rubbing the boiler with a little strong vinegar. Rinse very well before setting the still to work. A clean oyster or clam shell laid in the bot-

tom of the boiler will catch and hold a large part of mineral deposits.

Strain all water before it goes in the feed-tank. A cheap and handy strainer is made thus: Take a round of stout galvanised wire a little bigger than a bucket-top, and sew doubled mosquito-net strongly over the wire. In use lay the net circle over the bucket, and either pump or pour the water through it. Have several such strainers, so one may be always drying; and, once a week, drop them all in boiling water for five minutes, shake them vigorously about, drain, and dry well.

Distilled water is always flat. It can be made more palatable and more wholesome by the use of lime-juice and bi-carbonate of soda. Indeed, the juice of a fresh lime alone in a glass of water first thing upon rising is among the best preventives of malaria and stomach disorders, especially those due to changes of water. Summer travellers can do no better for themselves than to take along supplies of lime-juice and pure grape brandy. A dash of either in the drinking-water is a safeguard not to be despised.

People of gouty tendencies, whose water-supply is strongly calcareous, will find it well worth while to distil all they drink. Gouty pains come from the deposit of calcareous matter around joints and along natural passages. Distilled water acts by prevention. It is also efficacious against the calcareous deposit in veins and arteries, which is among the most unmistakable signs of advancing years.

As to Water-Pipes

Remember always that very hot water eats and wears out pipes much faster than water of moderate heat. Hence watch the boiler. If it begins to sing, set the hot-water faucet running, and keep it running until the

boiler feels cool to the back of the hand. But it should not be allowed to get singing-hot. Feel the boiler after breakfast, and again after dinner; if it burns the back of the hand, let off at least half the water in it.

It is quite as important to keep the boiler and hot-water pipes clean. No matter what the source of water-supply, there will be more or less sediment in the boiler. Once a month, at least, turn off the water—there is a special tap for the purpose—then open the faucet, and let all the water possible run off. When it ceases running, set a tub underneath the boiler, and open the tap at the bottom. When all sediment has run out, turn on the water again, and let the inside of the boiler have a good rinsing. Turn off the water again, close the lower tap, and again turn it on. There must be no range fire while all this goes on. Fire without a free circulation through the water-back would mean a dangerous explosion.

In very cold weather, pipes in cool apartments may be saved from freezing and bursting by leaving the taps running a little. The running must not be at full head, nor so faint as to freeze and clog the vent. A gentle, steady trickle is best. With spring faucets, wire back the handles. If a pipe freezes, do not try to thaw it out violently. A good way is to wrap the frozen pipe thickly with woollen cloths, and lay over them cloths wrung out of boiling water. Cover the hot cloths with dry ones, and as they cool renew them; or a warm flat-iron can be held over the cloths. This is only worth while where there is a short exposed length frozen. Heat, as of flame or coals, applied to a pipe considerably frozen may generate steam enough in one place to cause an explosion when it runs against the part still frozen.

Do not try to protect outdoor water-pipes either with ash-banks or by covering them with manure. Both substances eat and honeycomb the pipe, to say nothing of

the danger of contamination. Outside supply-pipes should run through brick conduits, well furred inside with clear half-inch pine stuff. Have openings in the conduits for ventilation in mild weather; in freezes see to it that the openings are tightly closed.

Chapter *FOURTEEN*

Lighting and Heating

IN the matter of light and heat, avoid extremes. But as between too little and too much of either, choose always too much. Light can be tempered, heat modified. Cold and darkness are negative qualities, but ill and costly to banish.

Lights and Lighting

Almost half the home-makers nowadays can rely upon lights from the outside. Electricity, municipal gas-works, private gas-works, and water-gas household plants, so abound, the lamp and the candle hide their diminished heads. As to either gas or electric light, all that can be said is in regard to location and economy. Side lights of either are much better than staring chandeliers, unless the room to be lighted is much bigger than the average American house affords. Good gas, unvaryingly of twenty-four candle-power to a standard four-foot burner, is a most economical light wherever it can be bought for a dollar the thousand feet. Above that price it is cheaper than electricity, light for light, but relatively dearer, in that an electric light of standard brilliance gives almost half as much again of luminosity as the same size gas-flame.

"*Matches are cheaper than gas.*" This should be printed in big letters, and stuck up in every kitchen and bath-room. Freely translated it means that lights should

be turned out the very minute they are no longer needed. The same is true of gas-stove burners, whether for cooking or ironing. Upon the same principle never light a jet until it is needed. True, it may consume but a trifle in excess of the normal amount, but it is the many mickles which in the end make up a disagreeable muckle.

Do not read by a light directly overhead, especially one that flickers. Buy a drop-light whatever else is done without, and, if possible, provide it with some one of the patent mantles, which give a flame so much whiter and steadier than the common burners. Shade the flame so the light shall fall upon the book, or work, or whatever is in hand, but miss the eyes. Let the light come over the left arm or shoulder. Do not burn it at full head. Experiment until the proper pitch is found. Always turn off a drop-light by the cock which supplies the flexible tube of it. Otherwise the pressure of gas in the rubber will most likely cause a leak. Once a fortnight, at least, take off the drop-light tube, and hang it out to air. Thus it will breed no gas odours to be mistaken for gas leaks. In case of a leak, either known or suspected, do not strike a match nor carry a light into a closed room to look for it. As soon as there is a perceptible smell of gas, open doors and windows wide. Illuminating gas mixed equally with air is among the most explosive compounds known. Find out where the stop-cock stands, so that in case of fire or accident the gas-supply may be quickly shut off.

A gas-jet which burns with a whistling noise is giving out more gas than it burns. Turn it down until the whistling stops. See that the tips and burners are cleaned and renewed at need. See also that every key stands square, and be especially sure that none of them turns clear around. At least one-half the fatal gas accidents are traceable to keys which either turn on the gas thus in the act of turning off, or to those which work so

loosely they can be dragged open by accidental contact with a hand or sleeve. Flat-top burners are generally better than round-topped ones, as they prevent the flame from spreading to break the globe. Globes of clear glass, or softly tinted, are best for the eyes. It goes without saying they must be kept clear and clean. Dust them out every week, and wash them every month, taking care to wipe them very clean, and thoroughly dry. Take care in handling gas fixtures not to lean upon them nor swing against them. Wash them clean now and then, but do not undertake polishing them.

Remember a soft clear radiance does not hurt or tire the eyes one-half so much as a white steely flare. Therefore, soften the most part of electric lights with bags of thin softly tinted silks drawn deftly about the bulbs. Try colour after colour, and use that which most rests the eyes. Beware of working too close to an electric bulb. In some cases it is said the light develops an X-ray property, and takes off the hair. Electric lights are on many counts especially desirable in closets, store-rooms, and cellars. Wherever possible such light should be arranged to turn off and on by the closing and opening of the door.

Lamps

All said and done, neither gas nor electricity can quite come up to perfect lamp-light. For perfect lamp-light, the first requisite is good lamps; those with central-draft burners are far and away the best. The student's lamp with the Rochester burner is as near perfect as anything likely to be made in lamp shape. The price of such a lamp runs all the way from two-and-a-half to twenty dollars. The difference is one of finish and ornamentation. Choose a lamp with a broadish solid base rather than one top-heavy, and given to oversetting. Look also at the size of the burner; unless it is big enough to hold

without packing a good-sized wick, the lamp will give a poor light. The oil reservoir had better have no other opening than that which admits the wick. Those with a special cap for pouring in oil are convenient, and, in careful hands, safe. But the mass of folk are in danger of being tempted by them to fill up a lamp already lighted, or else to leave wick and burner for so long undisturbed, both become clogged and gummy.

Do not let a lamp stand with a little oil in the bottom. Do not even light one that has stood partly empty for a week. The best oil vapourises under some conditions, and the vapour is highly explosive. Every burner ought to be supplied with an extinguisher, but where the extinguisher is lacking, do not blow down a chimney to put out a lamp-flame. Especially not if the lamp has been burned for several hours. Ninety-nine times in the hundred the lamp may be blown out safely, yet at the hundredth the flame may come in contact with gas, and do no end of damage.

Turn down a lamp-flame one-half before moving it from one room to another. But do not leave it low enough to smoke or smell. It will do both if left with flame showing dim. If the light must be moderated, either take the lamp outside or shade the flame, half-shrouding it, rather than turning it too low.

The vital thing about a student's lamp is to set and keep it level. If the oil-tank is for even a minute a little higher than the burner, the burner will be overflowed, with disastrous results. In filling such a lamp, be sure not to leave air-bubbles upon top of the oil. Such bubbles have a knack of choking up the narrow supply-pipe, and making the light dim and yellow.

Next to good lamps comes good oil, properly kept. The best oil is as white and clear as spring water, and will evaporate after a while, leaving no stain.

Oil keeps best in glass, at a temperature between fifty

and sixty degrees. Tin-cans are light, but in steady use given to springing a-leak at the most inconvenient seasons. There is a glass oil-can in an open-work tin-holder, with bail and handle, and coming in various sizes, that answers admirably in careful hands, or where it has only to go to the corner grocery for filling. Folk who must fetch home their oil-supply in a farm-wagon, and presumably over rough roads, will find nothing else quite so good for holding it as a five-gallon demijohn, with its wicker-work still staunch. The demijohn is of manageable size, does not overset nor break easily, and never, never leaks. With reasonable care it will last a lifetime, and still be a heritable asset.

Get the very best wicks, soft, of loose, rather coarse mesh, and big enough to fill the burners without any crowding or packing. A wick too small admits air into the oil-tank, thus setting up vaporisation. Further, it leaves a space for the passage of flame downward if a lamp is improperly blown out. The proper way, be it said, is across the flame, not from over-head. Buy, in bunches, wicks of sizes to fit every lamp in the house. Put all the bunches in a porcelain kettle, cover them with strong vinegar, bring the vinegar to a boil, and set where the kettle will keep warm for three hours. Drain out the wick-bunches, dry thoroughly, and keep away from dust. Wicks thus soaked and kept clean, both before and after going in the burner, almost never smoke. In use trim the wicks once a week, but always very lightly and evenly, taking off the snuff—the burned part—but never any charred wick. Some excellent housekeepers, indeed, never put scissors upon a wick. Instead they turn the wicks up an inch, then, with a coarse cloth held over thumb and forefinger, rub and pinch off the snuff. Whether cut or pinched, the main thing is to leave the wicks without tag-ends or jagged places. Tag-ends and jags mean always smoked and broken chimneys.

There are chimneys and chimneys—all breakable. Some are supremely so in the hands of the average maid-servant. Luckily they are also cheap; especially when bought by the dozen or the gross. If all the lamps of the household take chimneys of the same size, the gross is possible, and a sensible economy. After buying thus in quantity, put some shavings in the bottom of a wash-boiler, pack the chimneys snugly down in it, strew a handful of salt over them, then almost fill the boiler with cold water, and set it where it will come very slowly to a boil. Let it simmer for two hours, then take from the fire and cover so thickly it will be at least three hours in cooling. When it is cold, wash the chimneys in clear hot water with a suspicion of soda in it; rinse, also in hot water, wipe dry, and store on the highest shelf in the closet. There the warmest air in the kitchen will still further toughen them. Nine chimneys in ten break through unequal heating. Boiling this way, and keeping in a warm place afterward, seems to effect some molecular change which makes the glass much less liable to break.

Boil all the movable metal parts of lamp-burners once a month for ten minutes in strong soda-water, rinse well with boiling water, and either dry in the sun or on top of a hot stove. If the burners are clogged and gummy, scour them lightly before putting on to boil. A clean burner is nearly as essential to good light as a clean chimney. Wash the chimney also in hot soda-water, rinse well, wipe dry, and polish with crumpled newspaper.

For lamp-filling one needs a small glass funnel and a length of glass pipe open at both ends. Set the funnel in the lamp-mouth, and pour in oil steadily until it comes in view at the bottom of the funnel. If by chance it stands so high the wick would make it overflow, plunge the glass tube down inside the funnel, clap a finger over the open end, and draw it back. The surplus oil will

come with it, and may be held there by keeping the finger in place until the funnel is shifted. Lamps burn better for being full, but should not be too full; invariably then the oil oozes all over the top, and either runs down on the foot or vaporises, and makes the whole room smell.

Candles

More and more fastidious home-makers are coming back to candle-light. No other light compares with it for delicious softness or artistic effect. In country houses particularly, no other light is so desirable, nor so easily managed. Candles of good sorts are cheap, and likely to be cheaper. The same is true of candlesticks, but none of the thousand new sticks are to be named beside the tall old brass and silver ones too often stowed away in garrets or kicking about cellars. Happy the house-mistress who can lay her hands upon even a pair of them. If by any chance she has a dozen, then is she blessed indeed.

It is an insult to womanly intelligence to do more than name candle-shades. The woman who does not love them, and delight in designing and contriving them to suit her separate household occasions, is indeed fit for treasons, stratagems, and spoils.

Water-Gas

There are at the least twenty different patent contrivances for using water-gas to illuminate homes. The name water-gas is due to the fact that the gas is generated by allowing water to trickle down upon calcium carbide. In quantity the gas is so explosive, no municipality permits its storage in quantity within municipal bounds. But where it can be consumed almost as fast as it is generated, there is no danger whatever. It burns

with a brilliant steady white flame, and ranks next to electric light as an illuminant, though it gives too little heat for cooking. It has the drawback of smelling to heaven, a peculiar, pungently acrid smell, like nothing else smellable. This is in a way a safeguard, as the smell gives warning of over-production, or if the gas-generation goes on after burning ceases. While all the individual gas-plants differ in detail, they have a few common essential principles. One is the storage of the dry carbide—which is quicklime fused with carbon in an electric furnace—in separate cylinders, in charges, each calculated to supply so many feet of gas. The number of charged cylinders varies. Water is admitted to them one after another so as to keep up a continuous flow. The gas is led over into a general receiver, whence its own buoyancy takes it through the system of house-pipes. Theoretically the individual gas-plant is a boon. How it will turn out in practical demonstration is one of the things that remain to be seen. But certainly it should have the abiding merit of cheapness, since it is easily possible to supply water-gas at ten cents the thousand feet, and still make a handsome profit on the transaction.

As to Heaters and Heating

Since a good three parts of the world lives in hired houses, the manner of heating them is a fixed fact, to be accepted and made the best of. But in choosing a hired house, with two otherwise equally desirable, take that which has steam or hot-water heating in preference to a furnace. Similarly, choose open grates rather than stoves. Stoves can be so managed as to heat without harm, but in careless hands are deadly. The grate-fire, besides being the very best ventilator, is an excellent good comrade, withal no end decorative. Any uncluttered room indeed, with an easy-chair, an open fire, and a well-

swept hearth, is bound to be home-like and inviting, no matter how meagre its other plenishings.

A register cannot but be uncompromisingly ugly, withal somewhat depressing; still, a furnace unquestionably saves so much in work and fuel, its day is likely to be long in the land. There are several hundred patterns of furnace, but all have the same essentials, to wit—fire-pot, chimney-pipe, chimney-pipe damper, dust-damper, check, draughts, water-pan, cold-air pipe, and hot-air pipes. No two patterns of furnace have these essentials placed exactly alike; hence the most that can be done is to indicate generally the uses, and the way to make most useful, the several parts.

First, as to the fire-pot. If it is deep and narrow, it will hold heat tremendously, but give out a small supply proportionately to coal consumption. Such a shape is to be recommended where a low steady heat is required, without too much looking after. Contrariwise, a broad shallow fire-pot will make a house warm very quickly, but needs constant attention if it is to keep it so.

Flues and pipes need a yearly cleaning—in spring, if possible—just as they go out of commission. The cleaning out not only saves them from rust and corrosion, but discovers cracks and flaws at the season when repairs are cheapest and least inconvenient. It is well to give the pipes a further looking over when the time comes to build a fire. If there is the least thing wrong, have it instantly remedied, before even so much as a bit of kindling goes in the pot.

The cold-air pipe is a crucial point. There may well be two such pipes—one coming from each side of the house. Then, when the wind blows east or west, that particular pipe can be closed without inconvenience. The cold-air pipe's special function is to furnish pure air for the furnace's warming, and thus to save the house proper as much as possible from invasion by cellar air. Some

cellar air will go through the hot-air pipes in spite of everything; hence the vital necessity, in furnace-heated houses, of keeping cellars in the most sanitary condition. The mouth of the cold-air pipe must be outdoors, and well away from drain or sewer openings or the neighbourhood of cesspools, and high enough not to draw in damp earthy air. Since it is a pretty big pipe, more properly a box, the mouths need to be double-covered—first, with fine wire-netting to strain out dust, and over that coarser netting, to keep the first from breaking through. Both covers need to be removable in order that, at pipe-cleaning time, the cold-air pipe may be well brushed out with a long-handled brush.

The water-pan also had better be movable, so it can be kept scrupulously clean, since its use is to provide the hot air with enough watery vapour to keep it soft. A pan allowed to grow foul with sediment will taint the hot air irretrievably.

Steam heat requires the services of a competent engineer. Hot-water heating, though adaptable to private use, likewise needs trained attention for the best success. Stoves ought to be very carefully set, both in order to lessen the risk of fire and to keep down the danger of coal-gas. Wood stoves for heating are obsolete in most parts of the country. In hunting-lodges or sea-shore cottages, where fuel fit for them is easily come by, they are useful, but nothing like so beautiful as an open fire.

Gas heat has many drawbacks. If there is draught enough to make it sanitary, the cost is almost prohibitive. The ordinary gas-log or gas-grate throws out into the room along with its heat many acrid productions poisonously irritant to throat, lungs, eyes, and mucous membrane generally. Still, a gas-log in a properly ventilated fireplace is an excellent and not over-costly decoration to a room otherwise insufficiently heated if the log is lit only about six hours in the twenty-four. Gas

heat is especially undesirable in a bedroom. An oil-heater is much better—safer, and more sanitary. Indeed, oil-burning has been so perfected of late, the small oil-heater is the very best thing to use where continuous heating is not required.

Fuel—Choice and Care of It

Wood is out of reach of all but the very rich and the very poor. In cities the use of it lies mainly betwixt the millionaires and the ragamuffins, who gather to themselves the flotsam of buildings old and new. Still, many who heat their houses with coal cook their dinners with wood. Hence it may be worth while to say that stove-wood needs to be cut at least three inches shorter than the fire-box it is to fill; that small green sticks half-seasoned make a much hotter fire than those fully seasoned; also that hard wood cooks much better than soft wood, but that the ideal fire is begun with soft wood and continued with hard. Rotten or half-rotted wood is always unsatisfactory fuel, unless one wishes simply to keep a smouldering seed of fire. For that a bit of stump, especially one from deep in the ground, is the best thing in the world.

In buying wood for an open fire, choose oak, hickory, or elm, or beech, in round sticks or split three to four inches through. Every cord will contain more or less littery small stuff. Burn a little of the small stuff whenever a fire is lighted, and mix the sorts of wood; thus the burning is longer and more picturesque. Wood keeps better under a shed than in a cellar. If the cellar is inevitable, store the wood where it is coolest, and now and again sprinkle the sticks. They should not be soaked, but kept sufficiently moist to burn steadily. Wood bone-dry, as when kept in a furnace-cellar, flashes up and out all in a whiff. Kindling wood, however, can-

not well be kept too dry. It should be split rather coarse and of different lengths. Thus it will almost pile itself into the best possible kindling shape. In storing kindling wood, separate the splinters and very small sticks, so half-a-dozen may be laid next the paper at lighting a fire.

Coal is of two sorts—anthracite and bituminous. Anthracite is very black, hard, and shiny, with but little dust. Bituminous coal also black, is less shining, has a clumsier fracture, and a sort of greasy look. Anthracite burns with very little flame, and that blue rather than red. Bituminous, or soft coal, burns with much more flame—red, yellow, bluish, and white. It is also much smokier, and makes more dust and ashes. That is why in cities the use of soft coal is so largely forbidden, unless the users take pains to burn the smoke as well as the coal.

Anthracite is the best coal, bituminous the cheapest. The goodness or badness of either is largely determined by its freedom from slaty admixture. The slate veins are also black, but are readily detected. So it rarely pays to buy coal " sight unseen " unless one knows the dealer, and is satisfied that he will play no tricks. Anthracite is divided into red ash and white ash. The red ash is best, in that it burns up more completely. It is commonly about a dollar in the ton higher than white ash. At the mines or, rather, the breakers, coal is graded as to size. Standard sizes are pea, nut, egg, range, grate, and furnace. The size bought must be largely determined by the sort of grate or fire-pot for the burning. Obviously it would be a great waste to buy coal so small it would stream out between the grate-bars or the bottom of a fire-box, and almost as much so to buy it so big one lump could not lie close enough to another to admit of proper burning.

Wherever it is possible, the coal-house or coal-bin should have a tight floor slanting a little toward the door. Let the floor-planks opposite the door run through it

and three feet beyond, depressing the outer end to match the floor-slant. A coal-hod placed mouth down upon these sloping planks can be quickly and easily filled by raking in the coal with a light steel hoe. Further, with the sloping floor it requires very little strength to keep the coal always down at the door and ready for use.

For the very small sizes a tight bin, with a low spout something like a pump spout, closed by a sliding panel, saves much work. The spout must be just high enough for a scuttle to go underneath. Coal of such sizes must be kept strictly apart from the grate-supply or the big lumps for the furnace.

Except upon pain of freezing, permit nobody to bring coal until the household is ready for it. Do what one may, getting in coal is a dirty job. It ought, therefore, to be only a yearly one. August is a good time to put in the year's coal, and September better still. Have the storage place, whether house, shed, or bin, thoroughly cleaned out and whitewashed. If the supply comes through a sidewalk tunnel, cover steps, windows, and walls nearest the hole with old carpet, or heavy paper well weighted. Then, as the coal is dumped, let somebody sprinkle it well with a fine-rosed watering-pot or spray nozzle. Wet the pile down again as the putting away goes on. Open cellar doors and windows, or ventilators, but be sure the registers are tightly closed; also all doors from the cellar to the house above. After the coal is in, sweep the cellar twice, first with a wet broom, then a dry one. Lift carpets or paper very carefully, and shake the coal-dust from them into a scuttle rather than in the street.

If coal must be carried across a lawn or bit of garden, lay down planks for the carriers to tread or run their barrows on. Tramped grass, with coal ground into it, is seldom healthy afterward. Keep the plank from year to year, and have all ready for the transit before a lump

of coal falls. Here, as in the other case, sprinkling is useful—as anything is useful which helps to cleanliness by prevention.

Making Fires

To light a furnace-fire, see first that the pipe-system is in order, and the fire-pot and ash-pan free of ashes. Close all registers, next fill the water-pan. Half-fill the fire-pot with kindlings, the very lightest at the bottom, upon a little greasy paper. Open the draughts; that is, the holes in the bottom of the furnace-doors. Set fire to a wisp of paper, and thrust it in the chimney-pipe to start the up-draught, then set fire to the kindling, let it burn for five minutes; then put on some heavier sticks, and, when they are well caught, a thin layer of coal. As soon as this layer is well afire, fill up with coal almost to the top of the fire-pot.

Now open registers, fresh-air pipe, and the damper. When the deep coal is well afire, close the draughts. By and by, when the house is well warmed, open the check-damper slightly to still further slack the fire.

In moderate weather a well-built furnace-fire will last for twenty-four hours. In severe weather it ought to have fresh coal at night, and in arctic spells be kept so freely burning it will need a fresh hodful in the middle of the day. Combustion is regulated by draughts, checks, and dampers, the use of all which may be readily learned from the man who cleans out and looks after the pipes. One most essential thing in building up the fire is to close the draughts tight, and open the damper, leaving them thus for fifteen minutes after putting on the coal. This is to drive the coal-gas up the chimney-pipe. It escapes when heat first strikes through the coal, and is so heavy that, unless thus sent up in a forced draught, it will ooze and creep up through the registers, poisoning the house. Brighten the fire a little in the morning, and

put on a thin layer of coal before raking or shaking it. When that layer is well afire, do the shaking, and refill the fire-pot.

All that has been said of building a furnace-fire applies to stove-fires, especially the part about keeping draughts closed and damper open after putting on fresh fuel. A grate-fire is managed by help of a damper in the chimney throat and a blower. Kindle with crumpled paper and wood, then put on a little coal, and set it going with the blower. As soon as the blower gets very hot, fill up the grate, put on the blower again, let it stay till the coal is red half-way up, then take it down and close the chimney-damper.

To make a noiseless fire, as in a sick-room or a parlour, put the coal in paper-bags, and lay it bag at a time in the grate. Do not put on a fresh bag until the paper of the first has burned through. Thus a fire can be kept up not only noiselessly, but without dust or dirt. To take away the ashes from such a fire, sprinkle the ash-pan well before touching it, take it out, set it gently across a long doubled wire, catch the wire up each side, and carry outside the room. Brush up what ashes may remain with a feather brush, and wipe the whole space quickly with a damp cloth.

A range-fire—any coal fire, indeed—is built upon the same general lines as that in the furnace. But it is worth while to say that in a range-fire, baking depends on understanding the use of the damper. A damper, be it understood, is a flat movable iron-plate that when open lies almost flat against some part of range or furnace, and when closed very nearly shuts some aperture. In a range, what is known as the smoke-damper is most commonly right at the foot of the chimney-pipe. When it is open, smoke and hot air go curling up the chimney, passing only over the top of the oven. When it is closed, the smoke struggles, somehow, upward, but most of the

hot air is drawn under and around the whole oven-body to find exit at a lower opening into the chimney-pipe. It is in this passing around that the hot air carries with it the fine ashes which cover the tops of range ovens. They should be removed from the oven-top at least monthly. Fortnightly is better. Minute directions for range fires would be a waste of space. No two makes of range, hardly any two ranges, burn the same. Besides, a person of average intelligence will not make three fires without learning more than could be taught in a whole book.

Clinkers

Clinkers are the penalty of carelessness. If a stove is properly managed, and never allowed to get white hot, there will be no clinkers, which are aggregations of mineral matter fused from the coal, but unconsumed, and adherent to the grate-bars. The remedy for them is quicklime, either in its proper form, or as oyster or clam shells. Put the shells—which are preferable—over the face of a very hot fire, and let them burn up. The clinkers should come away in the ashes. If quicklime is used, be sure the lumps are well burned and not too big. They have a tendency to put out the fire instead of making it hotter, as is the case with shells. In taking up ashes after such a burning, strike the clinkers still adherent smartly with the poker. Unless they come away without difficulty, burn more shells or lime next day.

Softening Heat

A stove should have a vessel of water, an earthen vessel if possible, set on top of it whenever it holds fire. Empty the vessel daily, and wash it clean. With steam heat or hot-water heat, set earthen bowls full of water on top of each radiator. Furnace heat can be softened

either with the cheese-cloth screens (See Chapter on Sick-Rooms) or by hanging a big wet sponge in front of the register, whenever the fire is fiercest. Another way of softening furnace heat is to open wider the fresh-air pipe, thus giving more air than the furnace can dry out. This also reduces the heat, an end more cheaply attained by slacking or banking the fire.

Chapter *FIFTEEN*

Sick-Room and Nursing

SINCE the trained nurse is a luxury of woe beyond reach of so many of us, it is worth while to set down some things, possible to any person of ordinary intelligence, which, faithfully followed, will make her absence much less keenly felt.

Beds for the Sick

The ideal sick-room is very clean, somewhat bare, reasonably spacious, airy as all outdoors, well lighted but capable of being noiselessly darkened, windowed upon at least two sides, with an open fireplace, and doors so hung and fitted they do not slam, creak, nor bind.

Where choice is possible, take the room most nearly approaching these conditions. Remove all draperies and superfluous furniture, take up the carpet or cover it with a sheet of unbleached coarse muslin, tacked down smooth and tight, and glue felt-pads upon the legs of all sorts of small movables, as chairs, tables, and so on. A brass or iron bedstead, three-quarter size, is best. Single beds are handy in confined spaces, but do not admit of the easy postures possible on wider couches. Whatever the size or material of the bedstead, see that it is stout and tight, so there shall be no creakings or givings away, to torment over-wrought nerves or fevered brains.

A firm woven-wire spring, with a light curled-hair

mattress above it, is the best bed. Thick heavy mattresses are ill to turn and shift. Put either a thick comfort, or pad of cotton tacked between cheese-cloth, on top of the mattress, and change it for a freshly aired one every other day. Spread a clean sheet big enough to tuck in all round over the pad, and fasten it at the corners underneath the mattress with safety-pins, securely clasped. Tuck in the upper sheet at the bottom, but not along the sides, and be sure to lay a fold three inches wide in the sheet and the blankets, just above the foot. This keeps the bed-covers from binding the feet disagreeably, and producing cramps in them. The sheet should be long enough to fold back six inches over the top of the blankets, which should be so spread as to rest half-way up the bolster.

A soft bolster and three pillows of varying hardness complete the bed-furnishings. Nothing so rests a tired or fevered head as a fresh, cool pillow in a clean slip, of proportions unlike that on which it has been lying. Further, raising the head or lowering it often helps to induce sleep. In at least seven cases out of ten, sleep is nature's best medicine, and medicine's best ally. If a counterpane is used, let it be very light, and smooth to the touch. Illness accentuates every sense; rough or furry or honeycomb surfaces may be horribly irritating to racked or fevered nerves.

Set the bed well away from the wall, even at the head. No matter how quiet the house-seat, there will inevitably be jars and vibrations running through it, to communicate themselves to whatever touches a wall. Where the room is big enough, it is a good plan to put the bed quite in the middle of the floor, unless such placing brings the light over the patient's head or full in his eyes.

Other Furnishings

With the bed placed, set a small table, light but firm on its legs, a little way behind the bed-head. Cover it with a folded towel, changed daily, so nothing set upon it shall make a clatter. Keep on it a pad and pencil for marking hours to give medicine and nourishment, to record the patient's temperature, and such other notes of his condition as shall seem advisable. Beside the pad keep the clinical thermometer, soused in a glass of borax-water. Wash the thermometer clean before putting it in the patient's mouth, and wash again before it goes back into the borax-water. Change the water every day, and scald out the glass at each changing.

Space permitting, three tables are none too many. Have a small but stout one exclusively for holding the light, and a bigger one, with a drawer, for ice, medicines, cups, bowls, and spoons. It should have a washable cover, changed at least every other day, and a spread of cheese-cloth to throw over it. A tiny porcelain refrigerator is the best thing for keeping ice, but a cheap and excellent substitute for it may be made from a common red flower-pot and a wire trivet, with a cheese-cloth cosey for the outside. Get the flower-pot broad and flat, and see that the saucer is of generous size. Set the trivet in the middle of the saucer, lay a small block of ice on the trivet, then turn the flower-pot over it, upside down, and put a wisp of absorbent cotton in the hole at the bottom. Over the whole contrivance set the wadded cheese-cloth cosey, which is like a tea-cosey, only bigger, and tacked instead of quilted. Sew a big button on top to lift it off by. Spread a folded paper under the saucer, as after a while it gets moist through, and will mark the table-top.

A darning-needle of the biggest size, stuck into a little wooden handle, makes the best ice-pick for a sick-room.

Ice crystals run all one way, and a little study of the block will show it. Set the ice on the trivet so that the crystals may run up and down. When a bit of ice is wanted, take off the cover, stick the needle in a little way from one edge of the block and work gently back and forth, and the ice will cleave readily along its crystalline lines. Break several long slivers; they can be crushed in the palm by blows of the hammer. Thus crushed ice is quickly and silently made ready. There is hardly a form of illness in which, at some stage or other, crushed ice is not almost a necessity.

If a window can be spared, fit outside it a small fresh-air closet (see Chapter on Closets) for holding food. Nothing to eat must stand in a sick-room. Neither must food be kept where air from the sick-room will pass constantly over it. Open the window only when it is absolutely necessary, and close it the minute closing is possible. The fresh-air closet may cover only the lower sash, leaving the upper one available for ventilation. But, unless it can be kept closed, do without the closet. Better bring food all the way from the kitchen than keep it where it runs the risk of being poisoned.

If hot water is ordered for any purpose, do not use that which comes from the faucets. Boil it fresh, and, if possible, after filtering. The boiling is best done outside. But in summer, or where the kitchen is a great way off, a small alcohol-stove is a very present help. Oil-stoves should not be used inside a sick-room. No matter how carefully they are managed, they will smell enough to distress acute sick nostrils. For the same reasons lamps are out of place, unless in summer, with an open fireplace in which they can be set, and create a purifying draught up the chimney.

With gas at hand, a gas-stove is not objectionable. One with two burners is best. In cases of lung fever, bronchitis, and kindred complaints, there is often great

relief from setting a vessel of clean water over a gas-stove turned so low the water barely simmers. The vapour softens the air, and makes it less distressing to labouring lungs. There must not be enough of it to produce dampness.

With furnace heat it is well to put a screen of double cheese-cloth over the register, and keep the cloth constantly wet. Thus it not only softens the air, but strains it of dust and irritating particles, besides making it delightfully fresh. The best screen is a box a little bigger than the register-opening, mounted upon standards, open at one end, and with the cheese-cloth tacked firmly over the other. Set the open end against the wall; the hot air pouring inside will have to pass through the cloth before escaping. Set a bowl of clean water on top of the box, and lay tapes from it to the cheese-cloth. They will serve as siphons to keep the strainer wet. Fill up the bowl at least three times a day, rinsing it well each time.

Whatever the sort of light, have a screen upon the table with it. Thus it is easy to shade the patient's eyes. If candles are used, have at least three in light flat-bottomed sticks, and provide always snuffers and extinguishers. Do not blow out a candle. Instead clap the extinguisher over it. Thus there is no smoke nor smouldering. Beware of striking matches in a sick-room. Even to light a fire, bring in a taper set going outside.

Every sick-room ought to have at least one light folding-screen, with a scrubable white-wood frame, and panels of gathered lawn, cheese-cloth, or silkoline. Two screens are better than one; then a bed can be fairly inclosed while a room is thoroughly aired. Make the panels of stuff so cheap they can be burned when no longer needed. Where there is an open fireplace, there is no better way of ventilating a room thoroughly in

summer than to set the screens so as to inclose the fireplace; then shut doors tight and open windows six inches from the top, while an excelsior torch is burning out. That should take about five minutes; wire the excelsior loosely to a bit of lath eighteen inches long. The screens keep in the heat and force an upper draught, which brings down the foul air from close beneath the ceiling.

Besides the tables, the room needs an easy-chair and one or two light straight-backed chairs, preferably of bent wood. It should have also either a bureau, chiffonier, or closet, emptied of everything but sick-room requisites. They should always include great plenty of towels and bed-linen, extra blankets, a clean light comfort, a rubber blanket, flannel foot-cloths, and flannel bags for hot-water bottles; and, in a drawer wholly apart, the patient's bed-gowns, along with socks or stockings and clean handkerchiefs. A warm light shawl should hang close to the head of the bed, where it may be thrown about the patient at a minute's warning.

Temperature in the Sick-Room

Keep the temperature even, anywhere between sixty and seventy degrees that the physician may order. This is much easier in winter than in summer, but may be managed even in the dog-days. To do it, take out window-sash and remove doors from their hinges. Instead of them have light frames, like screen-frames, fitted or hinged, and fill them with double cheese-cloth. Keep the cloth wet constantly; in straining through it the air loses heat as well as dust. Very high temperatures are debilitating to most constitutions, but in exceptional cases heat proves tonic. Where there is wasting and great weakness, especially in convalescence, eighty degrees may prove as helpful to the patient as it is trying to the

nurse. The great thing as regards temperature is not to let it run up and down. Alternations of even ten degrees may be fatal; particularly in lung troubles or contagious diseases.

A sick-room is better without plumbing fixtures. If it adjoins a bath-room, open the connecting door as little as possible. Keep a pitcher and basin of water on the big table, also a bowl for rinsing things immediately wanted. Do as little washing up inside the room as possible. Do no cooking at all, unless to heat milk or broth over a gas-stove, bringing it in as wanted, and keeping it closely covered while it heats. The aim of everything is to prevent noise, dust, odours, and vibration. Set down things quickly and firmly, and keep all hard or polished surfaces covered, so there can be no sound. Do not rattle spoons against cups or glasses, nor drop them with a tinkle upon the tray. There should be two trays —one square, and big enough for a plate, cup and saucer, and tiny bone dish; one round, and just large enough to carry a cup or glass. There should be clean white covers for both, and care should be taken never to spill or slop things about them. Nothing under heaven is so capricious as a sick appetite, and often nourishment means more than medicine. This is particularly true in convalescence; then a good cook and dainty nurse are worth a whole army of doctors.

A bath-tub comes in well, but is not wholly essential. A foot-tub can in no wise be done without. Both should be of tin, well japanned, and as light as possible. Have also two tin water-carriers, a porcelain slop-jar, two light commodes with close-fitting covers, a great plenty of bath-sponges, plenty of ammonia, and a soap-dish well furnished with unscented soap. In addition, in a place wholly apart from all else, keep bottles of disinfectants — chloride of lime, soda-water, bichloride of mercury, copperas-water, etc. (See Chapter on Disin-

fectants.) Clear lime-water is best kept in the fresh-air closet, or wherever is the place for nourishment. But there may well be two bottles of it—one for disinfection. It is the only one among the disinfectants wholly without odour. Put a cupful into a commode before it is used, and after use add a cupful of some stronger disinfectant before sending the vessel to be emptied. After emptying, it should be scalded and set to air, with half-a-cupful of chloride of lime in the bottom. All the bottles must be marked in big staring letters, with their names, and "Poison" underneath. Take care, in refilling a bottle, to keep it true to label.

Cleaning a Sick-Room

A room thus managed will never need pastilles nor any other stuffy device for disguising ill odours. It will, however, need to be cleaned at least weekly. But never put a broom on the floor of it. Go over it with a dust-mop, the ends wrung very dry out of boiling water. Wash the mop out as fast as it grows soiled. If the patient is too ill for that, wipe the floor with a damp cloth every other morning. Put a little bichloride of mercury solution in the wiping-water, say a teaspoonful to the gallon. Take off dust daily with a clean slightly damp cloth, changing to a fresh cloth as soon as the first grows soiled. Let nothing littery nor dusty go inside the room if possible to keep it out. Have a thick soft mat outside the door, a yard or two away, and insist that feet shall be well wiped on it before they go inside. At both sides of the bed spread down lengths of washable cotton, which can be removed, and either shaken clean or washed clean twice a day. To clean under the bed, dampen an old bath-towel and pin it firmly over a clean light broom; then go over the surface, holding the broom almost flat, and moving it in long gentle strokes.

This can be done in a minute, and prevents the distressing accumulation of down and dust.

Summed in a word, sick-room cleanliness, like much else of sick-room management, means prevention. The room must be scrupulously clean in the beginning. Given that advantage, reasonable care will keep it wholesome for at least six months.

Windows in the Sick-Room

Windows are all-important—light and ventilation in large measure depend on them. Take down both shades, which are noisy, and curtains, which catch dust, and rely for the due modification of light upon either awnings or blinds. A simple awning, that can be made for twenty cents, is a length of stout drill proportioned to the window height, with a tuck run eight inches above the lower end. In this tuck a lath is slipped. The upper end is tacked to the outer edge of the window-frame. Three rings are sewn at equal distances apart up the middle, the lowest one resting upon the tuck. A cord runs through them, and into another ring screwed into the upper window-frame. This draws the awning up when not needed. When shade is required, it is let down and held out from the window by laths running from rings screwed in the window-sill, to other rings in the ends of the lath in the tuck.

To make a ventilator either at top or bottom of a window, take a half-inch board eight inches wide and an inch shorter than the space inside the window-frame. Screw small brass eyes into the ends of the board three inches from one edge. Screw corresponding hooks in the window-frame, a little way inside the sash. When air is needed, either raise or lower a sash six inches, then set a board over the opening. The eyes fitting over the hooks will hold it fast, and the inrushing air give it a

slight inward slant. Thus no direct draught will be possible, though fresh air comes in plentifully.

To soften or change light, often a most refreshing thing in long illness, have a light frame the size of the window hinged to one side of the casing. Fill the frame with any light texture of restful colours, as light green, light blue, dead blue, pale gray, or pearl, or creamy pink. When the light is strongest, the screen can be swung over the window, wholly changing the aspect of the room; then, when the light is less fierce, it can be admitted unscreened. Deep green screens, with soft white drapery flung over them, are especially restful to the eyes of fever patients.

Pictures nearly always irritate sick eyes, particularly after they have been stared at through weary night-watches. Often, in cases of nervous disorder, the wall-surface itself becomes hateful. Then, if a change of apartment is impossible, try the effect of wall-screens. They are nothing more than sheets of softly tinted stuff hung from a lath or pole to hooks screwed close under the ceiling. They must be self-coloured, with nothing staring about them. Figures on wall-screens or wall-papers, or any sort of hangings, have an atrocious trick of coming down from the wall to mop and mowe at the bed-fast. No strength of mind avails against this illusion of weakness, which has sometimes produced as real suffering as the most tormenting physical ills.

Sick-Room Management

Medicine and nourishment are matters for the physician's strict instructions. Write them down accurately, and follow to the letter. But, where latitude is given, use judgment in making variations. Do not hesitate to make them if any sudden or surprising change in the patient's condition seems to demand them. In writing

down directions, do not set it "a powder every three hours," but "powders at three, six, nine, and twelve"—of course, varying the hour, but keeping the order. Then there can be no bothersome debate as to when the last dose was swallowed. In like manner, if drops or a draught are to alternate, write: "Draught at eight, eleven, two, and five." Keep to the same plan as regards nourishment, also with variable directions, as: "Cold sponge-bath if five o'clock temperature is 103."

Keep this way-bill plainly written upon the table with the temperature-chart, where a glance will show what is needed. Set beside it a small clock which does not strike. If the ticking is disturbing, either set it outside or inclose it in a glass shade, or substitute an open-faced watch for it. But accept it as a cardinal truth that nothing justifies waking a patient out of sound refreshing sleep. Better let medicine, or even nourishment, go hang than thus cruelly to disturb nature's recuperative processes.

Do whatever needs doing to the last tittle, but not one grain beyond. That is to say, ease nerves, husband strength, and thereby effectually help the patient. Always be on time, but do not spend five worrying minutes in wait for the time to come. Never begin anything until ready to go through with it. If a hot bath is ordered, or a mustard draught or blister, at a specified hour, do not set up a great pother about it half-an-hour beforehand. In the sick-room, more than almost anywhere else, "They also serve who only stand and wait." To wait without fuming is a Christian virtue nearly as rare as it is adorable.

Bathing and Dressing a Patient

A sponge-bath in bed is one of the very best weapons against wasting fevers. To give it with ease to nurse and patient, first spread a rubber bath-blanket out full

size, and very smooth, then cover it with the softest old sheet at hand. Spread the sheet as smooth as the blanket, then begin at one edge and roll up the two, sheet inside. Continue until one-half the rubber blanket lies in a tight small roll. Then move the patient well to one side of the bed, spread the unrolled half of the blanket, sheet side up, over the bed there, bringing the roll in the middle of the bed. Next ease the cover and lift the patient over the roll, spread it out over the other half of the bed, and pin the two upper corners in place. Begin at the patient's feet and bathe upward, working steadily and quickly, and wiping dry as the bath proceeds. When the head and face are reached, get clean water, with a little aromatic ammonia or alcohol in it. Wash and dry quickly, remove soiled clothes, which have been pushed up around the shoulders in the course of the bath, also the bath-blanket and damp sheet, tuck the blankets well about the patient's head and neck, give a little nourishment or stimulant if permitted, and leave him for five minutes.

While he rests, take clean garments, which have been thoroughly aired and, if possible, sunned, put the sleeves of one well inside another, then spread them out in a crumply ring with the neck-bands in the middle. Gather up this crumply ring at the back of the garments, and lay them over the patient's head. Draw one arm from beneath the blankets, slip it through above his head; do the same with the other, then, lifting him slightly, pull the crumpled garments down level with the shoulders. Slip both hands under the blankets, and draw the clean clothes gradually down. Any well-conducted patient should reward such work by going straight to sleep, and waking much refreshed.

Change bed-linen in the same way the bath-blanket was used. It is better, however, to fold the half-sheet narrowly than to roll it. With a desperately sick patient,

do not risk taking off the cover to put on a fresh sheet. Slip the fresh sheet underneath the soiled one, gradually, while another person gently lifts the blankets. In the case of patients violently ill, it is well to protect the mattress with a rubber blanket spread smoothly over the mattress-slip. But there must be a comfort above the blanket, both for the patient's ease and as a further protector. If soiling discharges foul the sheet and comfort, yet the patient is too ill to be lifted, slip a folded sheet very gently underneath him, then have it raised an inch by a person lifting each corner, and slip out the dirty things, replacing them with clean ones.

Where it is desirable to change a patient from one bed to another, have the bed well aired, and warmed a little, even though it is summer. In cases of brain trouble, or where hemorrhage threatens, raising a patient even half-upright may mean death. If such patients needs must be moved when no stretcher is available, fold a wide comfort double, put a stout slat or pole in the fold, and lay the patient on it, then have four people lift it, one at each corner. The pole prevents sagging, which is the main danger.

Patients of this sort had better have fresh clothes slipped on over the feet, and drawn gradually up to the shoulders. Then, by moving them very gradually upon one side after the other, the arms can be got in the sleeves. But if motion occasions much distress, it is better to cut through the shoulder, and sew the sleeves lightly in position. Good housewives bear a conscience against cutting up good clothes, but it should never interfere with even the slightest easing of a very sick person.

A Sick-Nurse

Wear soft shoes, easy but not easy enough to scuffle about. They must be noiseless, of course. List slippers

are not particularly desirable. Soft kid, with a flat heel of moderate height, is better. Have a frock of wash-stuff, sewed fast at the waist. It should be soft but not clinging, and so cut as to escape the floor by at least two inches. A white apron, changed every morning, and a white nurse's cap are always advisable. The frock should be changed every three days for one freshly washed. A suspicion of starch makes the frocks feel cleaner, but they must on no account be stiff enough to rattle. They must likewise have neither ruffles, capes, strings, nor any sort of tag-ends. Neither must they be full enough in the skirt to flap and balloon about like a mainsail when the wearer needs to move quickly.

Nothing is better than fine seersucker, or prints in small patterns and soft colours, or neat checked ginghams. Have a collar of the gown stuff, but wear a strip of white inside. Trifles, these? No doubt—if there were such things as trifles in dealing with illness and the whimsies of sick folk. A trim and dainty personality inspires confidence, and, what is very much more essential, appetite. Here is a story in point. A man who had fought through lung fever lay hovering in the borderland between convalescence and collapse. It was very desirable that he should be nourished. His doctor, indeed, felt that there lay the *crux* of the case. With infinite trouble the sick man was persuaded to try to swallow a little broth. His nurse brought it duly, but before offering it slyly picked a speck from the edge of the cup with a finger not daintily clean. Consequently, the invalid pushed it angrily away, turned his face on his pillow, and could not be persuaded to touch food for twelve hours. When he did take it, it was too late. In three days he was dead.

Always speak low but clearly in the hearing of a sick person. Never stand talking in his sight but out of ear-shot; he will infallibly imagine himself the subject of discourse, and draw unfavourable inferences. Many

a desperate case has been pulled through in the strength of ignorance, and many more solely upon courage. Thus it behooves above everything to keep up the patient's courage. Nothing is much more depressing, however, than exaggerated cheerfulness and made-to-order mirth. The Bible to the contrary notwithstanding, it is not always a work of mercy to visit the sick. While in mild cases company may not do harm, or may even do good, nobody sick enough to raise a reasonable doubt as to the event of his illness should be permitted to receive indiscriminate visits, no matter how kindly they are meant.

Right there is one of the places the nurse's absolute authority comes well in play. She is for the time being no longer a person, but an entity under the physician's strict control, responsible alone to him and her conscience as to his orders and their carrying out. She can say without offence: "So far, no farther." If she is halfway fit for the place, she will of course exercise a wise and kindly discretion. Where the wearing business of night-watching stretches throughout weeks, she will know who to call on for help, and who to leave outside.

Contagion and Disinfection

A case of contagious disease should be instantly isolated in the room farthest away from the main family life. One person, and one alone, should take the nursing in hand. It is a cruel and often a fatal mistake to think that such disease must "go through the family." By the practice of a few simple precautions, it may be limited to the original case. Where the patient is a child, let the nurse be some person other than its mother, especially if there are younger children to be thought of.

Only the chosen nurse and the physician must go inside the sick-room. When either comes outside, it should be

clothed in a rubber cloak reaching from head to foot. The nurse's outings should be limited. All outside services should be rendered to a closed door, and stop there. When anything is brought or taken away, the nurse should be notified by a knock, or should summon help by ringing a bell hung some way off, but with the cord inside the room.

Make the room as bare as possible before taking in the patient. Remove carpet, curtains, rugs, pictures—everything, indeed, but the simplest necessities. Provide a cheap iron bedstead, if possible, with a spring cot for the nurse. Provide also earthen or well-japanned tin receptacles for every sort of waste. A good-sized foot-tub, to hold soiled clothes and bedclothes while they undergo disinfection, is almost indispensable. So is a big light tin-pitcher for holding the bichloride of mercury solution (see Chapter on Disinfectants), which is the mainstay in the fight against contagion.

Provide gallons of this solution. All discharges, no matter how virulent the disease, may be removed without danger if they are covered fully with the bichloride. Cover soiled things with it likewise before setting the tub containing them outside. Once the solution has reached every part of a fabric, no living germ remains in it. It is best to let clothes and bedlinen lie in the solution several hours, or even over night. Commodes or bed-pans must be quickly emptied, cleansed, disinfected afresh, and sent back.

Twice a day, clothed in a long rubber cloak, one may go to the door of the sick-chamber, and through it ask news of the patient. Regard for health forbids going oftener. Though the rubber cloak minimises the risk of infection, it is not an absolute preventive. The door should be well stripped inside. If there is another opening into an adjoining room, paste paper over the crack around it before the patient is taken in. Do this even

though the room be unoccupied. Germs are kittle cattle, with which one must take no chances.

Remember always in scarlet-fever that the most dangerously infective period is when the convalescent patient begins peeling. Rub the patient lightly with vaseline twice a day, and wash off in warm soap-suds just before the fresh application. This keeps the infective particles from flying off as dust, but makes frequent changes of clothes and bedlinen imperative; also the most thorough disinfection of the soiled things before washing. Measles is only faintly infective after cough and fever abate. Small-pox spreads most readily from a patient in the fever stage, but is also specially communicable when the dried vesicles are falling off. Diphtheria, typhoid, and other of the filth diseases are communicated through the infected matter thrown off at all stages. No discharges from such patients should be emptied without the most searching disinfection. One mild case without such precautions may easily breed a hundred malignant ones. Where there is no system of drainage, all such discharges should be deeply buried after disinfection, but in a place where they cannot possibly contaminate either a water-supply or food crops growing in the ground.

To disinfect a sick-chamber of this sort, first burn the mattress and comforts unless it is possible to have them treated with superheated steam. Blankets may be disinfected with the bichloride solution, then washed, sunned a week, and washed again. Go over the room walls, scraping them thoroughly; then wash floors, walls, and ceiling well with the bichloride solution. Make them sopping wet. When they are dry, paste paper over every crack and crevice around windows, or in the walls, or anywhere about the inside of a closet. Before covering the closet cracks, deluge them with bichloride, then cram them full of putty. By way of finish, tack a strip of tin so as to project two inches over the edge of the

room door, and hug the casing tight when it is shut. Now put a broad shallow iron-pan in the middle of the room, set in it a skillet, standing on legs say three inches high. Put into the skillet a pound of flowers of sulphur, pour on it an ounce of alcohol, and stick into it a small lighted fuse calculated to burn two minutes. Go outside, shut the door, and keep it shut five minutes. Peep in then; if the room is full of sulphur smoke, shut it again, and leave it shut twenty-four hours. At the end of that time the room may be opened, aired, scoured, and refurnished in full security against lurking germs.

A Medicine-Closet

Keep medicines in a wall-closet so high as to be wholly out of reach by childish hands. Have double doors to it, each with a separate and secure lock, catching in a bar at the middle. All the inside ought to be cut up into pigeon-holes. In one side keep every sort of stuff that is even remotely poisonous. In the other store such standard things as calomel, borax, bicarbonate of soda, prepared chalk, Dover's powder, blue mass, quinine, castor-oil, rhubarb, Epsom, Rochelle, and Carlsbad salts; alum, dry copperas, spirits turpentine, spirits camphor, alcohol, whisky, brandy, all the family of herbs and barks, lint, bandages, finger-stalls, adhesive plaster, burn salves, healing salves, dry mustard, and healing lotions. Keep everything in bottles, wide-mouthed bottles with either screw-tops or ground-glass stoppers. Wrap the medicine bottles in blue paper to exclude light, and label them outside, in addition to labelling the bottles.

Never put a half-used prescription nor any medicament of unknown composition up in this closet. Throw away any compound left over; there is no telling what changes time may work in it. Upon the poison side keep opium, laudanum, morphine, cocaine, dry blue-stone, white

vitriol, flowers of sulphur, Paris green, dry corrosive sublimate, dry chloride of lime, all the family of acids—oxalic, nitric, sulphuric, carbolic—ether, chloroform, tartar emetic, or any other substance capable of harm. Each substance should be in a tightly stoppered bottle, or tin or wooden box, so well closed air cannot get in or out. This half the closet must be kept always locked, and should have a single key, always in possession of the house-mistress, and seldom trusted out of her sight.

Poultices, Bandages, the Uses of Plaster

Prepare for emergencies—then they are not half so formidable. Devote old linen religiously to bandage uses. Tear it lengthwise into strips two to three inches wide, join the strips flat, laying one end on the other and running twice with soft thread into lengths of two or three yards. Pull off all ravellings, then begin at one end and roll up the bandage in a smooth softish roll. Make as many of these rolls as will half-fill a glass fruit-jar. Put a light weight in the bottom of the jar, pack the bandages over it, then fill up to the top with absorbent cotton, and set the jar upon an inverted plate, in a kettle of cold water, deep enough to have the water come within an inch of the bottle-neck. Put the kettle over a slow fire, and heat the water to about one hundred and eighty degrees, and keep the heat steady for three hours. Remove the kettle, let it cool somewhat, screw on the jar-top tight, and when cold take out of the water, wipe, and set away. The bandages and cotton will have been sterilised by the heat; hence in no danger of infecting a green wound.

Make bags of old linen for poultices, with loosely run drawing-strings at the mouth. In use half-fill the bag with the poultice-stuff, and spread it by pressing between the palms. For poulticing a boil or abscess, first lay

over the rising a bit of sterilised linen, lightly wet with olive-oil. On top of that put the poultice. If sterilised linen is not at hand, scorch a bit beside a flame or under a hot iron. Where poultices must be applied very hot, use three of the bags, keeping two of them constantly upon a bit of board laid in a hot oven. Wrapping the bags in soft flannel keeps in the heat, and often helps a poultice to abate severe pain.

Mustard poultices wet with white of egg burn quicker than if water is used, but never blister the skin. Hot water is better than cold for wetting. Mix the dry mustard with half its own bulk of flour, wet to a soft paste, and spread evenly, about twice as thick as paper. Cover the face of the plaster with fine old lawn or very fine cheese-cloth. Where quick blistering is desired, wet the mustard with pepper-vinegar.

Where there are many children, especially boys, it is wise to keep finger-stalls in plentiful stock. Make them to fit all sizes of finger, either of stout cotton or wash-leather, sew on narrow tapes for tying up around the wrist, and hang in rows upon the inside of the medicine-closet door. When a cut or bruised or mashed finger must be treated, wash it very clean, unless the bleeding is excessive, put a small flat pad of sterilised absorbent cotton over the hurt, then wrap a little more cotton around the finger, draw on a stall—open-ended or closed, as required—hold the hand fingers up, and deluge stall and finger with spirits turpentine. Keep the hand up, but resting easily, for fifteen minutes. Unless there is pain, and inflammation shows beyond the stall, leave the hurt alone for two or three days. Generally in that time it will heal beautifully.

Children, especially boys, should be taught, when they wound themselves on hands or feet in outdoor play, to at once suck the wound very clean. Lock-jaw, the thing which makes cuts and bruises dangerous, comes from a

bacillus that abides in dirt and grime. The toy-pistol mortality after the Fourth of July is due to the fact that the small boys who get hurt by their pistols have commonly very dirty hands. A dry wound—that is, one that bleeds very little—is much more dangerous than one which bleeds freely. Sucking such a wound is the best means of instant cleansing. Before dressing such a wound, wash it very well with surgeons' soap and tepid water, and paint with a camel's-hair brush dipped in very weak carbolic acid.

For a gaping, bleeding cut, take a strip of court-plaster, two inches wide and rather longer than the cut. Fold it down the middle, and cut across the fold at eighth-inch distances, but do not let the cuts reach the edge. Leave at least a quarter-inch there. Then cut half the strips loose at one edge, the other half at the other. The result will be two toothed strips of the plaster. Moisten them, and apply one each side of the wound. Hold the edges of it together while the strips dry a bit, then moisten the teeth of each strip, and stick them down across the cut so as to hold its edges touching. This saves stitches, which are no end painful, and apt to leave ugly white scars.

Until the Doctor Comes

Send for the doctor straight away in case of either serious illness or accident. But there are various simple things that may be done while waiting for him. As for example, in case of a fainting person, to loosen clothes, particularly where they bind the neck, to lay the head low—a little lower than the body, if possible—to dash cold water in the face, hold ammonia under the nostrils, rub wrists and temples with alcohol, camphor, or cologne water, or, if the faint is severe and prolonged, to put mustard upon the back of the neck. Give all the air possible, and permit no crowding. Even with an insen-

sible person such crowding somehow robs the air of vitality. Insensibility from a fall predicates concussion. Offset it by vigorous friction of hands, feet, and along the spine. Stimulate at the earliest possible minute. Handle with the greatest caution, especially if there is a chance of an injured spine. Keep the patient reclining, but with the head something higher than the feet, the whole body in a gentle slope.

For Cuts or Wounds

Where blood comes in jets from even a small wound, there is no time to lose. The jetting is from a severed artery. Tie two handkerchiefs together, drawing the knots very hard. Slip them about the wounded part between the wound and the trunk. Look for the course of the artery; set a knot well over it, thrust in a short stick, and twist it round and round until the knot indents itself deeply in the flesh. Keep the knot there until the surgeon comes. Five minutes in such a case may mean life or death. Cut veins, though not so dangerous as severed arteries, are sufficiently so to need almost equally prompt treatment. Where blood flows in steady streams of dark crimson, put the knot below the wound, and twist it as before directed. Veins gather up blood from the extremities. Arteries take their supply straight from the heart.

In Case of Burns

Burns, wide but not deep, may be coated with varnish, or covered thickly with dry flour. A better thing for them is the lime-water and oil liniment. (See Chapter on Disinfectants—Lime-Water.) Spread the liniment with a feather or camel's-hair brush, and lay cotton-batting thickly over it.

For Acid Poisoning

For any of the acid poisons, as carbolic, nitric, sulphuric, oxalic, give raw eggs—at least three or four—sweet milk, melted lard, or flour and water mixed as thick as cream. Follow with calcined magnesia mixed in tepid water. Emetics are inadvisable; they rouse the seared stomach to too violent action. For narcotic poisons, as laudanum, opium, morphine, give first an emetic —mustard stirred thick in tepid water—and follow it with very strong coffee, a half-cupful every ten minutes. Keep the patient moving, dash cold water over him, put ice to the back of his neck, and make him smell aromatic ammonia. For chloroform stupor, give aromatic spirits of ammonia well diluted, make the patient sniff it continually, keep him moving in the open air, and, if possible, apply a galvanic current to the back of the neck.

Ptomaine Poison

Strychnine and prussic acid act so quickly, antidotes avail nothing. If ptomaïne poisoning is suspected, give active emetics, stimulate the patient, keep him warm, and put mustard upon stomach, wrists, ankles, and the back of the neck. Arsenical poisons all require first an emetic, and then, without waiting for its action, two or three raw eggs, with a glass of sweet milk afterward.

For Nose-Bleed

For obstinate nose-bleeding, either put ice to the back of the neck, or pour cold water from a height so as to strike the crown of the head. Hold the head well up, and plug the nostrils with pledgelets of absorbent cotton wet in weak carbolic acid. Stretch both arms well above the head, and keep them there ten minutes. On no account bend over, but do not lean back so far the blood will perforce run down the throat.

Chapter *SIX'TEEN*

Bleaches, Disinfectants, and Insecticides

WHEREVER water is used in preparing insecticides, bleaches, or disinfectants, it had better be soft. The alkali in hard water affects all chemical substances more or less. This chapter does not pretend to tell exhaustively of the things comprehended in its heading, but, rather, to indicate the things most readily compounded, most easily and safely applied, and most urgently needed in the ordinary household.

Bleaches

JAVELLE WATER: A standard preparation for bleaching white things, and removing spots and stains from them. It must not touch coloured surfaces, as it is certain to fade them. To make it, dissolve half-a-pound of washing-soda in a pint of boiling water, and mix it with a quarter-pound of chloride of lime, dissolved in a quart of boiling water. Stir well together, let settle, pour off the clear liquid, and keep closely corked in a dark place, as it loses strength by standing in air and light.

LIME-WATER: This is not strictly a bleacher; indeed, it has so many uses, it is hard to classify. It is good to

soften water, to sweeten drains, to keep milk-vessels wholesome, to make milk itself set well upon squeamish or delicate stomachs, to test air for excess of carbonic acid—too much carbonic acid instantly crusts the clear lime-water over—to take out the marks of grease, which stronger alkalies have removed; in fact, for so many, many things no house ought to be without it. By beating it well into sweet-oil or linseed-oil until the mixture is creamy, there results one of the best household remedies for burns and scalds. Beyond all that, lime-water costs hardly anything but the trouble of making, which is too slight to be worth a thought. Put a lump of quick-lime as big as the two fists into a clean earthen pitcher, cover it six inches deep with cold water, stir well with a wooden spoon, and let stand six hours. Pour off the clear liquid without disturbing the lime, but let it run through double cheese-cloth. Keep in small bottles tightly corked. In use, always pour off half-an-inch from the top of a bottle newly opened, or one that has stood for a day undisturbed. Thus one gets rid of the crust—the fine iridescent pellicle formed by the lime combined with carbonic acid.

Chloride of Lime: Solutions of chloride can be bought easily and cheaply; still, there are many times and many more places where the dry chloride is safer and handier to use. Buy it in moderate quantities, a few pounds at a time, as it loses strength by standing. A solution of standard strength is thus proportioned—one pound dry chloride to one gallon boiling water. Dissolve in wood, or earthenware, or glass. Keep the solution tightly corked, partly to preserve the strength, but more to prevent oppressive smells.

Carbolic Acid: With drug-stores in easy reach, it is scarcely worth while to dissolve carbolic crystals; it is so easy to buy a solution of any desired strength. But, since all the world does not live next door to the apothe-

cary, it is here written down how to dissolve the acid for one's self. Buy the crystals of it, which are among the deadliest poisons, say half-a-pound at a time, and keep them in a thick glass bottle with a ground-glass stopper, and well wrapped from light. Set the bottle on straw in a vessel of water, let the water boil, and keep it hot until the acid dissolves. Two tablespoonfuls thus dissolved added to a gill of cold water gives a solution of standard strength—twenty-five per cent. Keep both bottles plainly labelled, as: "Carbolic Acid Crystals—Poison," and "Carbolic Acid, twenty-five per cent. Solution—Poison."

Oxalic Acid: This is good for spots and stains rather than general bleaching. It will, however, whiten time-yellowed linens with less wear than any other thing. Put a gill of the solution in two gallons of freshly boiled water, and wet the linens thoroughly in it before washing. Take care not to scratch or cut the hands, as the oxalic acid is a virulent poison. Hence never venture to keep it without a staring poison-label. Put four ounces of acid crystals and half-a-pint of cold water into a bottle they will a little more than half fill. Shake until the water is a saturated solution; that is, until it has taken up all the acid it can dissolve. A few ragged crystals will remain. After using part of the first solution, add a gill more water.

The Bleach-Barrel: Our grandmothers swore by the bleach-barrel, and well they might. Silks and ribbons and Dunstable straw bonnets were none so plenty in the good old times that they could be thrown aside for a little yellowing. Still the bleach-barrel has its uses, not perhaps identical with those of elder times, but worth considering. It is no more than a headless barrel, set on end upon the ground or the hearth. Inside it there is an iron or earthen vessel to hold a handful of live coals. Across the top are sticks for hanging things, with a thick

cloth to cover the whole contrivance. Wash whatever is to be bleached, as silk, lace, fine woollen things, or straw hats, or silk stockings, through light suds to remove the dust; rinse well, putting a little vinegar or lemon-juice in the water, wring very dry, dust thickly with powdered starch, and hang over the sticks in the barrel. Cover with the cloth, then tip up one edge, fill the inner vessel with live coals, and dash upon them two ounces of flowers of sulphur. Set the barrel edge down quickly, so as to imprison the sulphur vapour. Let it stand for two hours, then remove the cover, pull the things in shape, and hang to air. After airing, brush out the starch with a soft bristle brush. Straw hats need to have the band removed, also to be very little wet. A rim of stiff card-board inside the crown helps to keep them in shape.

Disinfectants

Carbolic Soap: Shave and melt a bar of mottled Castile soap. The melting is best done in a water-bath, so there shall be no danger of scorching. Beat into the melted soap, a little at a time, half-a-pint of carbolic acid solution of fifty per cent. strength. Keep on beating, with the soap still in the water-bath, for at least a quarter of an hour. Mould into small cakes or balls, and let stand a month in a dry place. Suds made from this soap, or scrubbing with the soap itself, will disinfect glass, pottery, and metal. With wooden vessels, burning is the thing. Carbolic soap-suds, however, will destroy germs in wood-work if applied to it boiling hot.

Bichloride of Mercury: The king of all antiseptics is bichloride of mercury—more familiarly known as corrosive sublimate. Dissolve four ounces of the salt in a gallon of boiling rain-water. Let it cool before using. For most purposes this can be diluted one-half. It is very nearly the basis of antisepsis. Surgical instru-

ments are kept covered with the solution to the very moment of using, as only thus can they remain in the state known as "surgically clean."

Bichloride is also a powerful insecticide, whose uses have been indicated in other chapters. (See Chapters on House-Cleaning, Sick-Room, Plumbing, and Sanitation.)

Sulphate Solutions: All these have special uses in disinfection, yet are prepared practically the same way. Sulphate of iron, known colloquially as copperas or green vitriol, may serve as an example. Dissolve a pound of the salt in a gallon of water at slow gentle heat. Six hours should suffice. The result is a saturated solution. Weaken it one-half for flushing drain-pipes in fair condition. A neglected water-closet which gives out foul odours should have the solution at full strength, and boiling hot. Open drains, as about stables, or from kitchens without plumbing fixtures, also need to have the copperas-water boiling hot, though it need not be more than one-third strength. Dry copperas scattered through the litter of a stable, or about poultry runs, helps to sweeten them, also to prevent infection.

Blue vitriol, or blue-stone, technically sulphate of copper, is less a disinfectant than a preventive, or, rather, germicide. Make the solution as with copperas, but dilute with four times as much water before using. Mixed in whitewash, and applied boiling hot, it banishes infection from kennels, stables, or poultry houses. Its main use is to destroy the grain smuts, all due to germ-infection of the seed. Many garden-seed grow more vigorously for wetting with the blue-stone water, and drying well before sowing.

White vitriol, sulphate of zinc, is a powerful astringent and effective germicide. Like all the other vitriols, the solution of it needs to be carefully handled. Dissolve four ounces of the salt in a half-gallon of boiling water, strain, and bottle, taking care that the bottles are very

clean. Use the solution to clean and disinfect sores, especially indolent old sores, diluting it with five times its bulk of tepid water. It is especially good on the frost-bitten feet of poultry, or frost-bitten combs, and, discreetly used, for the ailment known as "scaly leg."

All three of the vitriols are used in medicine, but the fact acquits no one from the charge of criminal carelessness if they are kept without the proper poison-label.

Cellar Disinfectants: Quick-lime, borax, charcoal, dry copperas, and plaster, are the things to make and keep a cellar sweet and fresh. Move out all things movable, sweep, take up dust, open bins and closets, and set doors and windows wide. Then in every bin or inclosed space set an earthen vessel, a dish or bowl, with several lumps of quick-lime in it. Strew grains of dry copperas all over the lime, then slack it, but do not wet it, yet be sure the slacking is thorough. Steam from the lime, rising up and out, will take away all bad air and ill odours. Leave the cellar open and empty for two hours, then scatter dry powdered borax all around, in corners and along the walls; and, wherever there is a place where it will not be in the way, hang a piece of net, such as fish-net, with some lumps of fresh charcoal tied inside. Leave the borax until next cleaning-time. Take down the charcoal bags every few weeks, empty them, heat the charcoal very hot, return to the bags and replace them. Charcoal has marvellous power to absorb all sorts of bad smells. The power is strictly proportioned to its freshness, which the heating restores. Make cheese-cloth pads of plaster, mixed with powdered slacked lime, and hang them against the walls that are likeliest to be damp. Both lime and plaster are so thirsty, they take all spare water to themselves, thereby preventing must and mould. A good way to make the pads is to stitch or run inch-tucks in a length of cheese-cloth or coarse lawn, then slip a

funnel spout into the open end of a tuck, and pour in the plaster and lime. Make the tucks an inch apart, and fill them evenly. Powdered charcoal may be mixed with the lime and plaster for pads which are to hang where food-stuffs are kept.

Insecticides

Moth-Killing: In the matter of moths, prevention is a million times better than cure. But where the pests exist, as in a rug or a carpet on the floor, there are two effectual remedies, both of which are troublesome. The first is steam, homœopathically applied. Disturb the infected spot as little as possible, but spread over it a thick clean towel wrung out of hot water. Cover with a second towel also thick, and iron at least three times with blazing-hot irons. Repeat over the whole infected surface. It may kill every live moth, but may leave eggs. Within a week repeat the process. A fortnight later go over the carpet again. The work must be very thorough, and kept carefully continuous, as, if a single hand's-breadth escapes the steaming, it is likely to prove the breeding-ground of a new moth-crop.

Where there is sufficient ventilation to prevent danger of fire or explosion, also to carry away the smell, naphtha, or even well-refined kerosene, is excellent for moths. Sweep the surface clean, then go over it with a paint-brush dipped in naphtha until it is sopping-wet. Be careful to begin work upon uneaten surface, and to put a naphtha belt all round before touching the worst spots. This is to keep the moths from running into new harbours. Keep the room closed tight for six hours, so the naphtha fumes may have a chance at flying moth-millers. Then open all doors and windows except those leading inside, and go through the room, fanning out the naphtha-gas. No light should be brought into a room so

treated for at least two days, and it is a wise precaution not to strike matches in a hall adjoining so long as a smell of naphtha is perceptible. Neither the naphtha treatment nor the steaming, if properly done, will affect the most delicate colours. Small woollens suspected of harbouring moth-eggs may be wrapped in thin clean cloths, with thick wet towels rolled outside, and popped into a very hot oven until the towels scorch slightly. This gives a steaming sufficient to destroy most of the eggs. Repeat it ten days later, especially if the woollens are to be packed away.

To Kill Roaches and Water-Bugs: Mix dry powdered borax with its own bulk of white sugar, and set it in shallow vessels all about where the crawling pests disport themselves. Renew the mixture every few days, taking care to sweep up and burn all the dead insects. Paint visible pipes, and the spaces where they enter the wall, periodically with turpentine. Let the turpentine run down and around the pipes, especially hot-water pipes, but be careful to do it when the water is cool. Now and again pour a spoonful of pure turpentine down sinks and traps. Cut Irish potatoes in half, dip the cut sides in the borax and sugar, and lay them about under sinks, tubs, and closets; indeed, in any place that offers safe harbourage. Do this toward evening. In the morning gather the potatoes, which should lie cut-side down, very quickly, and drop them into a bucket of boiling water. If insects are plenty, there will likely be from one to a dozen clinging to each piece.

Larkspur: The common garden larkspur is one of the very best insecticides; the trouble is, one can seldom buy it, and the most part of those who need it have no chance to raise it. It should be sown rather thickly, and cut when the first flower-stalks are well budded. Dry in the shade, tie in bundles, and hang where it is dry and airy. Every part of the plant, leaf, stalk, and blos-

som, has the virtue of killing vermin, more particularly the vermin which infests living things. For fleas, lice, mites, upon cats, dogs, and poultry, a washing with larkspur soap, followed by dustings with larkspur, powdered and mixed with cornstarch, works wonders. Unlike carbolic soap, the larkspur soap is not poisonous; thus an animal licking its coat after the washing is in no danger. To make the soap, first infuse a generous handful of dry larkspur stems and leaves, in barely enough water to cover, for several hours. Strain off the tea, melt some good white soap in a water-bath, and beat the tea well into it. Continue beating until the soap cools, and leave the vessel containing it in a warm place for several days. Then cut out the soap, and set the cakes to dry. They should have a faint greenish colour. For the powder, pick off leaves, make them crisp in the oven, rub fine between the hands, and sift through fine net. Mix what passes through with starch, but do not throw away the coarser residue; it serves excellently to make wash for scalding out nest-boxes, bird-cages, and so on. In using the powder, part the hair along the animal's back gently, and shake in. The nearer the back-bone and spaces back of the ears are covered, the more certain the effect.

In the poultry-house larkspur is invaluable. A strong infusion of it, mixed to a whitewash, prevents mites, the minute pests which most trouble all sorts of feathered things. Mix larkspur-stalks in the nest-straw for sitting hens, and shake the powdered leaves, mixed with flowers of sulphur, well through the feathers on the back and around the neck. Mix the same powder well through the ashes of the dusting-box.

For Mosquitoes: The mosquito is commonly a local issue, seldom prevalent more than a mile from his breeding-spot. Hence the usefulness of prevention. Mosquitoes invariably breed in stagnant water. Seek out all such spots as soon as ice melts, and cover their surfaces

with thin layers of crude kerosene. One ounce will spread over fifteen square feet of surface. Two weeks later make a second application, and, after a month, a third. By concerted action almost any suburban place or country neighbourhood may be rid of these pests.

Where prevention is impossible, close sleeping-rooms tight in the morning, and burn in each of them a teaspoonful of Persian insect-powder. Leave closed for three hours, then air well while the sun is hottest, and put back screens. Where a room must be occupied at once, and is found infested with mosquitoes, put a pinch of gunpowder upon a plate, set it in the middle of the room, and touch it off by means of a greased thread, lighted and allowed to act as a fuse. The concussion of explosion will kill most of the mosquitoes, and so stun the rest they may be easily fought away.

Poison Powders: Paris green, Scheele's green, and London purple, all of arsenical origin, are the things wherewith to conquer the myriads of garden insects. Most of these insects live by eating or sucking young leaves, vines, and stems. Such as the squash-bug, potato-beetle, grasshopper, locust, and flea-bug, quickly kill themselves if given the chance. To give them the chance, mix half-a-pound of the poison powder with half-a-pound of flour, and a pound of sifted slacked lime. Tie it in a cheese-cloth bag, and dust the plants well while dew is on them, or just after a rain. Newly set cabbage may be dusted the same as squashes, melons, and potato-vines. The poison vanishes in fifteen to twenty days; besides, if it did not, one would have to eat a whole barrel of the cabbage at one sitting in order to get enough arsenic for a dangerous dose.

Bordeaux Mixture: Dissolve a pound of blue vitriol in five gallons of water, stirring well that no lumps may be left. Mix a pound of powdered unslacked lime with water enough to bring it to the consistence of creamy

milk. Stir well, strain out any grit, and mix slowly with the blue-stone, then add four gallons more of water. This is to be sprayed or sprinkled through a very fine rose upon shrubs and trees afflicted with rust, or any sort of fungous growth. If there are insects as well, some form of arsenic powder may be added to the mixture, which must be constantly stirred while the sprinkling goes forward. Bordeaux mixture, indeed, is standard and sovereign for grape-rot, mould, mildew, and scabby rust. Apply to grape-vines as soon as the fruit sets, so as to prevent even the appearance of evil. A later application, when the berries are half-grown, should bring them to ripening sound and perfect.

Kerosene Emulsion: Put into a big jar half-a-gallon of kerosene and one quart of buttermilk. Stir hard with a wooden paddle, the harder the better. In five minutes the emulsion should begin to swell, and grow thick and buttery. If sweet milk must be used, turn it with vinegar before putting in the oil. For winter use on outdoor things, dip a sponge in the emulsion and go lightly over bark and branches. Never use the emulsion full strength upon any green and growing thing. Mix it with fifteen to twenty times its own bulk of warmish water, when it is to be used as a spray or for sprinkling. Thus used, it is sure death to plant-lice and all sorts of soft-bodied sucking things. For banishing red spiders, stir a little sulphur—an ounce to the quart—into the emulsion, then dilute with twenty parts water. Do the spraying or sprinkling as near night as possible, since it stays on longer then; besides, that is the time when predatory creeping things are most active.

Bisulphide of Lime: This is equally valuable against plant or animal lice. To make it, mix half-a-pound flowers of sulphur with half-a-pound quick-lime, cover the mixture with boiling water, and boil for at least five hours, until a dark-brownish strong-smelling liquid re-

sults. Dilute this liquid with one hundred times its bulk of warm water, and use as either a wash or a spray.

Soft Soap: For the orchard, garden, poultry-house, and stable, soft soap has many, many uses. All sorts of waste fat can be turned into it. Mutton fat, almost useless for any other purpose, makes excellent soap for washing fruit-trees. But whatever fat is used should be tried out, and kept where it will not become offensive. For soap-making, take three pounds of fat, and clarify it by boiling an hour with two gallons of water, and a bit of alum as big as the end of the thumb. Let it cool on the top of the water. Dissolve a pound of pearl-ash or concentrated lye in boiling water, stir it well, let it boil two minutes longer, then take off the fire, and add the grease gradually, stirring hard all the time. Keep stirring until the mixture is nearly cold. Then put back on the fire, and add five gallons of boiling water a gallon at a time. Let the pot boil gently for half-an-hour, stirring every few minutes. Take out a little soap at the end of the half-hour, make a lather with it; if no grease shows on top of the lather, the soap needs only another half-hour's cooking. If it is greasy, put in more lye, adding it gradually until the grease is taken up. If the soap does not thicken a little on cooling, add grease, a spoonful at a time. Cook steadily until done—an hour at least after adding the last grease or lye. Rightly proportioned at first, an hour's boiling is enough. Unaccountably some fat is much greasier than other fat, and one can of pearl-ash or lye may differ from another in strength, although manufacturers honestly strive to make the strength uniform. Let the soap cool in the boiler; hot soap will run through the tiniest crack or crevice in a barrel. To turn the soft soap into hard, stir in half-a-pint of clean salt to the gallon of hot soap, let it cool in something broad and shallow, and cut out the cakes. Soap keeps better in cakes, but, though they may be redissolved, the re-

sultant liquid is not quite so good. Use soft soap on fruit-trees and grape-vines in late fall or early winter, going over them well with a cloth or brush dipped in the soap diluted with its own bulk of boiling water. Scour out kennels, nest-boxes in poultry-houses, perches, and occasionally walls, with very strong suds, applied boiling hot. Make the same sort of soft soap-suds to scour mangers and floors in stables, especially if they have become vermin-infested. Nothing is much more efficacious against rats and mice than very strong soft soap swabbed for a foot or so inside their holes, and plentifully bedaubed around the hole-mouths.

Against Flies

House-flies are more than pests. There is a distinct menace in their buzzing and crawling. Screens do not always keep them out; neither is it always possible to use screens. Here are some fly-preventives, each warranted harmless to human-kind. Boil together two ounces of ground black pepper, four ounces of white sugar, and half-a-pint of sweet milk. Cook about a minute, then fill plates with the mixture, and set them where flies most do congregate. They will crowd to suck and die. Renew the mixture every two days. Keep everything edible closely covered while using it, so dead flies may not drop in. Sweep up the slain twice a day, and burn, or bury at least a foot deep.

Or, if there is a coffee-tree *(Gymnocladus Divisus)* within reach, get fresh boughs and twigs of it every day, and set them close to windows, above doors, and under tables; indeed, in all the house-fly's happy hunting-grounds. As the leaves wilt, the flies will go away; yet there is to human nostrils no offensive odour. The only trouble is to keep up the supply of fresh branches. After the leaves dry, the flies come straggling back. A remedy as potent,

and easier, is a sponge saturated with oil of lavender. If it is hung two or three feet above a table, flies will not trouble the table throughout a meal. Branches of rose geranium, bruised and hung up, or even pots of the growing plant, are said to have the same effect.

Flea-Fighting

The wicked flea pursues man, his dog, his cat, his pig, and, now and then, his cow and his goat. Wherefore he is a pest not to be lightly regarded. Cleanliness prevents him for the most part, but now and again into each life some fleas must fall. In addition to the remedies heretofore indicated for him—the larkspur soap, the bisulphide solution, the dry sulphur, and other things—one can depend on walnut boughs, full of fresh green leaves, or the leaves themselves, stripped off, and tied in cushiony bunches. Spread them under beds, on floors, around doors, and renew often. The pungent pennyroyal, either as oil or green plant, will also banish him to some extent. Dry borax dusted through the hair of a cat or dog will help to kill fleas; so will almost any good insect-powder. Fleas breed and harbour in dust, dirt, strawy litter—most of all, in shed hair. Old hog-beds, or the places where hogs have slept even a little while, are almost sure to swarm with fleas throughout the summer. If one needs must, as in camping, or picnicking, or in occupying a summer cottage, set foot in such places, the first thing is to rake and sweep up all that is rakable, sprinkle the pile well with flowers of sulphur, then with kerosene, and set it afire. If this is impracticable, as where the flea-harbour is under a house, get poles of pawpaw, red gum, young hickory, anything, indeed, with sweetish sap, have them peeled of bark—it will slip easily in summer—run the poles into the flea-territory, let them lie a while, then draw them carefully out, and scald with fully boil-

ing water. The fleas will cling to the poles, sucking for dear life; especially if they are thin, starveling fellows, who have never known the delights of blood-sucking.

Moles and Mosquitoes

Fight moles and mosquitoes with the same plant—the stately *Palma Christi*—the castor-oil plant. The seeds are the mole-bane. Drop them plentifully in the runs. Dig down neatly, so the mole will not suspect his burrow has been tampered with. If the castor-oil beans are smeared with sugar, they are said to be eaten more greedily. Against mosquitoes use leaves and branches of the plant. If there is water about, as a fountain, or a lakelet, plant the beans thickly around the edges. They grow five to ten feet high if given the chance, and are highly ornamental—sub-tropical as to foliage, and weird as to bloom and seeds. In addition to preventive planting, as around water, windows, and piazzas, set a borderful, somewhere out of sight, from which a daily supply of leaves and branches may be brought indoors.

Bites, Stings, Ivy Poison

All sorts of stings—whether from wasps, bees, hornets, or humble bees—should be sucked, to remove as much poison as possible; then have a slice of acid fruit, apple, tomato, or peach, or a crushed berry, or grape either ripe or green, bound lightly to the wound. If the pain is very severe, after a minute take off the fruit, wash the sting in warm water, and bathe it well in alcohol. Then wet a folded linen-rag in either alcohol or vinegar, and bind on the sting. If neither alcohol, vinegar, nor fruit of any sort is at hand, try a bruised plantain-leaf. Change the application, whatever it is, every ten minutes until the pain subsides.

Suck a bite, especially a spider-bite or snake-bite, very well, but be sure the lips and tongue have no raw places. If the bite inflames, and looks deadly angry, send for a physician, and, while waiting for him, wash the wound with carbolic acid in warm water, then bind on it a slice of fat pork or fat bacon. If the pain of a bite is agonising, do not hesitate to cut open the bitten place deep enough to make the blood come in a rush. If a hand or foot is bitten, tie a handkerchief about it between the wound and the trunk, and draw the ligature tight enough to slacken the flow of blood. Give the patient whisky, and keep aromatic ammonia to the nostrils. If there is fulness in the head, loosen the clothes at the neck, and lay a cold cloth upon the crown of the head and another on the nape of the neck. Put mustard to ankles and soles of the feet. In short, do everything possible to keep up heart action and keep down convulsive tendencies.

For ivy poisoning, sponge the poisoned parts well with alcohol. Go over the skin twice or thrice, using a clean cloth or sponge each time. In an hour repeat the sponging. It acts like a charm. Where alcohol is not at hand, daub the poisoned spots all over with vinegar made thick with gunpowder, and leave it on until dry.

Chapter *SEVENTEEN*

Healing Simples

NOWADAYS the folk who sneer at healing simples as "old women's remedies," are those who think they know so much, they prove they know very little. Herb-cure is not another name for faith-cure. Of old a wise man wrote, "The earth hath in it the virtue of all herbs." Now, in face of Kneipp barefoot cures, rest cures, grape cures, heaven knows what, let the book-learned cease from scoffing at the mention of barks, roots, and herbs.

Tar as a Therapeutic

Good pine-tar has in it nearly the whole virtue of the pine-woods; it is, so to speak, the soothing pine-scent made concrete. Tar is the residuary juice in pine-trees killed by scraping off the outer bark in gathering turpentine. It is distilled from the hearts, cut to fire-lengths, and burned in great kilns. For rheumatism, rheumatic gout, and some forms of dyspepsia, pure pine-tar, in pure apple-brandy, makes a fine medicine. Put two tablespoonfuls of tar in a quart of the brandy, and let stand two days, shaking well several times. Begin with a tablespoonful dose. Increase or decrease it according to effect.

Tar pills, which are exceeedingly good for dysentery and all chronic troubles of the alimentary tract, are made

thus: Measure half-a-pint of tar, melt, and strain it, then beat into it half its own weight of fresh yolk of egg. Boil a peck of white-walnut bark in water to cover it for six hours, strain out the bark, and boil down the liquid to a strong gummy ooze. There should be about half as much ooze as tar and egg. Mix all well together, then set in the sun under glass for a week. Make pills as big as a small grape, and roll them in fresh-grated calamus-root. One is a dose—to be taken at night just before going to bed.

Tar ointments are good for all sorts of skin troubles, and also fresh wounds. For scald-head, milk-crust, or obstinate ringworm in the head, or chronic eczema, warm pure tar until it will barely run, and beat it gradually into its own bulk of freshly churned butter, unsalted, washed clean of milk, and creamed. Make a cap of black silk to fit the head close, leaving the seams outside. Smear the inside thickly with the butter and tar, put on the cap, tie it firmly in place, and leave it on until it comes away of itself. The hair, if any remains, must be cut short before putting on the cap. When it comes away there will be commonly a growth of healthy young hair starting underneath it.

For wounds and malignant sores, take the tar and butter, and set in a water-bath while beating in half their bulk of melted beeswax. Mix thoroughly, then add gradually, and stirring hard all the time, as much strong elder-flower tea as there was wax. Beat until the tea is taken up to the last drop. In use, soften the ointment, but do not melt it, spread it upon silk or linen, and apply as a plaster, leaving it to come off of itself. But if such a plaster, or any tar or resin plaster sticks longer than agreeable, lift one corner of it, and sponge the skin underneath with alcohol. Keep sponging and pulling at the plaster until it is loose. This will not hurt nor irritate the skin, which is apt to be very tender.

White-Walnut Tea

For acute bowel troubles, accompanied by nausea, white-walnut tea is helpful. The inner layer of bark, next the sap-wood, is the medicinal part. Strip this inner bark at the time the bark slips—that is to say, about midsummer—and dry it quickly in the shade. Keep the bark dry. To make the tea, put a handful of the bark in a quart bowl, of china or earthenware, cover it with hot water, and let it stand in a warm place for six hours. Sup the tea from the bowl as hot as it can be swallowed. But never boil the tea. It must be an infusion, not a decoction. Things infused by steeping thus give out properties unlike those yielded in boiling. White-walnut tea thus infused is bitter, but of a wholesome taste. A decoction made by boiling would be acrid enough to turn a delicate stomach.

Saw-Brier for Nerves

Saw-brier, which is properly field-smilax, has a dozen cant names—cat-brier, crawfish-brier, cow-scratch, and many more. It grows in almost any abandoned land with more or less luxuriance, but delights particularly in poor clays or sandy soils, where few other things thrive. It has a slender thorny stalk, big waxy leaves, inconspicuous flowers, and small round black berries, with heavy blue bloom. The root only is medicinal, though the berries are said to hold an active poison. The roots spread out of all proportion to the upper growth, and form a net-work through the ground. They are creeping and jointed, of a yellowish colour, with big, woody knops, the size of the fist, scattered all along their intricacies. From these knops in part, brier-root pipes are carved. In them also abides the plant's virtues.

For hysteria, faintness, sleeplessness, loss of appetite

—in fact, for almost any condition demanding both a nervine and a tonic—take fresh woody knops, wash them clean, cut them small, and fill a bottle with them up to the neck. Pour in whisky, pure corn whisky, enough to cover the cut roots. Give as much of this whisky as the patient's stomach will bear; it may be half-a-spoonful or a single swallow at first, and rise quickly to a wineglassful three times a day. Saw-brier thus administered seems to act directly upon all the mucous surfaces, toning them and setting them about their proper business. Thus morbid secretions give place gradually, therefore safely, to normally healthy ones. Few things are more dangerous than to have morbid secretions too suddenly dried up. Such secretions mark Nature's effort to rid the system of poisonous matter. If the poison remains to be reabsorbed, it is sure to come out again with tenfold its original venom.

Blackberry-Root—Dewberry Cordial

Blackberry-root tea has saved many an ailing baby's life; still, it is not so good as cordial made from either blackberries or dewberries, combined with the root. First wash a peck of fresh roots very clean, and boil them in five gallons of water until it is reduced to one gallon. Strain, boil up again, and skim well, then add it to the strained juice from half-a-bushel of full-ripe berries, cooked for ten minutes before straining. Boil the mixture five minutes, and skim it very clean. The cooking must be all done in brass, or block-tin, or agate-ware. After the skimming put in five pounds of cut-loaf sugar, an ounce of whole alspice, as much race-ginger, and a handful of carraway seed. Boil fifteen minutes longer, stirring and skimming well. Take from the fire, add good corn whisky, in the proportion of one quart to two quarts of juice, and let cool. When cold, strain out the

spent spices, bottle, and seal. The older this cordial is, the better. It is not only almost a specific cure for bowel troubles, but an effectual preventive. A teaspoonful to a tablespoonful in a glass of water, taken the first thing upon rising, will take one safe through a sickly summer, even in an unhealthy locality.

Chamomile for the Complexion

Chamomile *(Anthemis Nobilis)* is so well recognised in *Materia Medica*, it is grown upon a commercial scale in several places, notably round about the pretty English village of Hitchin. Cultivators there, indeed, have developed a variety with flowers as double as the double China aster. Medicinally, however, the double flowers are no more potent than the ordinary single-rayed yellow-eyed sort found in so many old gardens. Chamomile shares with the walnut and the damson the curious property of thriving best where trodden. Hence the proverb, older than Shakespeare: "Tough as chamomile—the more you tread it, the more you spread it." Tradition avouches that another name, "The Rebel Flower," was given the plant during the American Revolution. A British officer, walking through a garden beside his patriotic hostess, asked the plant's name, and was told "The Rebel Flower—because the harder it is trodden, the more it spreads."

All this, however, has nothing to do with the plant's uses and properties. Leaves, stalks, and blossoms, are all medicinal, but, as a complexion specific, use the blooms alone. Pick them as soon as open, just as the dew dries off, spread thin upon a clean sheet, and dry in the shade. Put away in paper-bags hung where it is dry and airy. Use for headache, languor, lassitude, muddy skin, and slightly fetid breath. Take a handful of the dry flowers, put them in a china bowl, and cover with a pint of boil-

ing water. Throw a cloth over the bowl, and let it stand in a warm place for two or three hours. Let the patient, when ready for bed, sip the tea very hot. This should be done three nights in succession. It stimulates all the excretory glands, and especially those of the skin, gently but thoroughly, making the complexion velvet-soft, and of a fresh wholesome colour. It also gives lustre to the eyes; this, of course, where there is no serious disease. If there is weakness and emaciation, as after fevers, colds, or especially grip, with pronounced sallowness and hot, dry hands, boil dandelion-root to a strong decoction and mix it with the chamomile tea, fortify the mixture with half its own bulk of whisky, and give a wineglassful three times a day before meals.

Another chamomile bitter, better suited to some constitutions, is made by **inf**using equal quantities of thyme, chamomile flowers, dandelion-root, and spice-wood bark, in warm water for twenty-four hours, then adding the strained liquid to double as much whisky. Give a tablespoonful at a time twice a day—upon rising and just before going to bed. Children require teaspoonful doses, and those under five years old, half that quantity.

Wild-Cherry—Bark and Fruit

The wild-cherry flavour is a princess among bitters. Notwithstanding it is a true bitter, but clean and refreshing, with a delightful after-tang. Use the inner bark cut in midsummer if possible. Next to midsummer come the dead winter months—December and January. Prepared wild-cherry bark may be bought of almost any herbal druggist, but, where trees are accessible, it is better to provide one's own supply, as thus its freshness may be insured. Still, the bark keeps excellently, holding strength several years, if it is put in a dry place away from the light. In passing, it may be worth while to say that

all sorts of herbs lose strength by standing or lying long in strong light; possibly through the action of the chemical or actinic rays.

For insomnia, with loss of appetite, try cherry-bark water. It is the simplest remedy in the world, yet often as effectual as simple. Put a tablespoonful of bark broken fine, or two or three good-sized strips of it in a tumbler, fill the tumbler with pure cold water—cistern water if possible—let stand until the water is well coloured, then drink at a draught. Refill the glass, let stand several hours longer, drink, and refill a second time. After drinking the third filling—it had better be done upon going to bed—throw away the bark, and put in fresh, setting it to steep, well-covered, until morning. Do not let it stand in a sleeping-room. Drink off the bark-water before breakfast. Keep drinking for a week or a fortnight. After six weeks, unless the health is fully re-established, stop the bark-water for a week, then begin again. Its action is very gradual, but in seven cases out of ten it will soothe frayed nerves and tone weakened stomachs.

For a cough, hoarse or hacking, which hangs on persistently, try wild-cherry and rock-candy. Pour a quart of cold water upon as much finely shredded bark as it will cover, and set for two days in a cool place. Strain off the liquid, which should be a deep wine-brown, pour it upon two pounds of white rock-candy, and set in a water-bath for six hours. The water must simmer rather than boil. Let the bark-water and candy stand open, so they may be slightly reduced. Shake them occasionally to help in dissolving the candy. When it is all dissolved, strain the syrup, add to it the clear juice of two lemons and a quart of good corn whisky. Corn whisky is especially required, as it lacks the fiery taste of rye whisky, which, by irritating a delicate stomach, may set up sympathetic coughing. Bottle the syrup in small bottles, and

take in doses from a teaspoonful to a tablespoonful upon rising, going to bed, and in between whenever the cough is troublesome.

Wild-cherry bounce is made thus: Gather the ripe cherries, pick, and wash clean, and to each measured quart put two pounds of lump-sugar and a gallon of pure corn whisky. Pack down fruit and sugar together in a wide-mouthed vessel, pour the whisky over them, tie a cloth over the vessel-mouth—something sleazy, like cheese-cloth or burlaps—and let stand in a fairly warm place for six weeks. Then close the vessel tight, and set away. The liquor fattens and fines by standing on the fruit. It improves wonderfully with age, both in flavour and curative properties. If spiced flavours are approved, as where the bounce is to serve as a liquor, strew whole alspice, cloves, and blades of mace, in among the fruit and sugar, also a race or two of ginger. A teaspoonful of cherry bounce, especially old cherry bounce, in a tablespoonful of water is an excellent stomachic, also a nervine. The bounce neat, in thimblefuls after dinner, helps wonderfully in the digestion of a full meal.

Bergamot and Balm

Bergamot and balm are both garden herbs, and strongly sudorific; that is to say, sweat-provoking. The balm, known otherwise as "Texas Sage," is a rough-leafed plant, with streaks and blotches of white all over its foliage. Bergamot, with an odour faintly reminiscent of true bergamot, has the same habit of growth as the balm, but is much darker; the stalks and under sides of the leaves are, indeed, a dull, dark wine-red. Both plants grow luxuriantly, and spread by sending out runners much after the fashion of a strawberry. Unchecked they will take the border they grow in, and, if dug up and cast

away, often root themselves in gullies or fence-corners, and flourish there, sublimely indifferent to their surroundings.

For malaria, and particularly its after-effects—as sallowness, weakness, severely painful joints and muscles—a good balm-sweat may work wonders. At least half-a-bushel of the fresh plant is needed for it; a bushel is all the better. Spread a rubber blanket over a mattress, put a sheet on top of it, and let the patient lie there while the balm is packed all over and around him. In case of tender skin, or abrasions or bed-sores, put a very soft thin cloth on before applying the balm. It must be taken by handfuls dipped for half-a-minute in boiling water, drained, and packed close over and around the affected parts; also at the soles of the feet, the small of the back, and especially over and around the region of the liver. Work quickly, keeping the patient covered fully all the time. When all the balm is on, tuck a dry sheet well down over it, then spread on that heavy blankets. Put a cold cloth on the head, and give alternate sips of cold water and hot herb-tea—as sage-tea, or balm-tea, or thyme, or sassafras, or even chamomile. Keep draughts from the bed, and leave the patient undisturbed until the wet balm begins to feel cold to him, then whip it all off, lay him on a dry sheet or blanket, and sponge him well all over with warm alcohol. He should stay in bed for six hours afterward, eating nothing, but drinking all he chooses. If he sleeps, as he commonly will, he is likely to wake minus pains, and plus an unwonted appetite.

Bergamot can be used the same way, but is not so good as balm, in that when wilted it has a rather rank smell. But wisps of it dry are good to keep away moths. Further, tender leaves of bergamot and balm, picked free of the stalks, and stewed slowly in very thick sweet cream for twelve hours, make a most excellent unguent for all sorts of angry and inflamed sores. If the sores are old

and cankerous, pick very tender wood sorrel-leaves, and stew them up with the balm and bergamot, and also add to the mass some very thick slippery elm-ooze. The salve is best made in June, when all the vegetable ingredients are at their prime, and the cream has, further, a healing quality, derived perhaps from the lush new grass. Keep the salve in little glass or china pots, closely covered, and apply on old linen or soft white silk.

Sleeping Potions

Where sleeplessness is rooted in nervous trouble, any doctor knows enough to say gentian is the thing for it. The blue closed gentian—New England's "dumb foxglove"—is better than the open sort. Since it is best gathered in flower, and does not flower until October, the root has to be dried over a very slow fire. Dig up the whole plant, though only the root has virtue, and let the clump wilt thoroughly before wringing off the tops. Separate the roots gently, wash very clean, and spread thin upon a board, which should be hung above the fire. When fully dry, wrap in thick paper, put the paper in a bag, and hang where it is dry and airy. To make bitters, slice the gentian-root very thin, and put into whisky in proportion of two tablespoonfuls of sliced root to the quart. Take a sip at morning just before breakfast, and a good full swallow upon going to bed.

The sleeplessness of convalescence—as after wasting fevers, especially lung fevers, or that from mal-nutrition or extreme debility—requires something more tonic than gentian. To make it, get May apple-root—Shakespeare's mandragora—dandelion-root, and hops. Both the roots should be pulled up in early June, when the plants are in flowering and fruiting strength. Dry them in the shade after washing very clean. For a bitter, steep a handful of each root separately in a pint of boiling

water for twelve hours. Pour another pint of hot water upon a teacupful of hops, and let it stand the same length of time. Strain the three liquids, mix, and add one pint of whisky, made aromatic with nutmeg and orange-peel. Give a tablespoonful at a time before or after meals, as the stomach takes it best, with another spoonful upon going to bed.

Sometimes a hop pillow brings sleep after all else has failed. It may further be supplemented with the hop foot-bath. For the pillow put a gallon of dry hops in a double cheese-cloth bag, big enough to hold them loosely. Just before going to bed, heat the pillow very hot, then slip it inside a cool fresh cover, and lay on top the feather-pillows. For the foot-bath, tie a quart of hops loosely in a square of cheese-cloth, throw them in a foot-tub, and pour on enough boiling water to half-fill the tub. Hold the feet in the steam until the water is cool enough for bathing, then soak for ten minutes, rubbing well with the hop-bag. Drink a little cold water, and keep well wrapped while bathing the feet. Rub them hard for at least a minute after drying them, and go straight to bed.

For Green Wounds

The velvety yellow marigold—Chaucer's "Marye-budde that shutteth up his eye"—makes the finest healing lotion for cuts, bruises, strains; indeed, all manner of hurts. Cut off the flowers, freshly opened, just below the calyx, cram a wide-mouthed bottle full of them, cover with whisky, and set in a dark place. Pour the liquid, neat, upon a cut or snag. It heals both man and beast, and, contrary to expectation, eases rather than hurts. For a bruise or strain, wet a soft bandage in the lotion, and apply, with a dry bandage outside. In three hours or so, pour on more of the lotion; in fact, the bandage should be kept moist with it for thirty-six hours. It

keeps down swelling and inflammation, and, further, largely prevents discoloration.

The ripe fruit of the balsam cucumber, treated the same as marigold flowers, makes a lotion of much the same properties, but, if anything, more soothing. Black-snake-root *(Cimifuga Racemosa)*, known familiarly as rattle-weed, made into a tincture, is better than arnica for hurts of every sort. Dig the roots in June, when the tall white blossom-spikes are open half-way up, wash clean, dry in the shade, and keep dark. Slice the dry root thin, or break it small, and cover with either whisky or alcohol. Let stand a week in a warmish place before using. This is among the things which should be kept constantly on hand, labelled distinctly, but ready for instant use. The same may be said of both the other lotions, which will heal any hurt if given half a chance.

Yarrow *(Achillia Millefolium)*, otherwise wild-carrot, and known in France as "the herb of the carpenters," is another thing good for cuts, especially those that bleed freely. It has strong styptic properties; hence is useful for nose-bleed. Pound the green leaves to a paste, and apply directly to the cut, binding in place rather tightly until the flow of blood is checked. Then slack the bandage, but do not take off the yarrow for six hours. For nose-bleed, make pledgelets of the beaten leaves, and force them gently up the nostrils, holding the head up the while.

Willow tea, made from the bark of *Salix Alba*, is a good wash for festering or cankered wounds and sores, especially those grown sluggish. Take the soft inner bark, and boil in rain-water or distilled water for an hour. Boil in block-tin, or agate-ware, so as to avoid canker. Wash the sores with the tea about blood-warm twice a day. Since prevention is ever so much better than cure, treat wounds and ulcers, if other things are out of reach, with a strong elder-wash, made from either the flowers

or the bark and leaves of the common elder—*Sambucus.* Put on flowers or leaves in something non-cankerable, cover plentifully with cold water, bring to a boil, skim, and simmer half-an-hour. Strain, and use blood-warm; that is to say, at ninety-eight degrees. The wash is slightly astringent, and wonderfully antiseptic. Make it fresh every day, and heat what stands over from one washing to another well toward boiling before using it.

Vermifuges

Seed from the every-day pumpkin, sacred in the popular mind to Thanksgiving, are among the best remedies for tape-worm. Wash the seed from a thoroughly ripe pumpkin free of all pulp, and dry in gentle heat. Make tea of them by boiling a teacupful in a gallon of water until reduced one-half. Give in the morning upon an empty stomach, and let the patient fast for at least four hours. The tea may produce nausea, but it will do no harm. If the nausea is pronounced enough to weaken the patient greatly, give the tea only one morning in three. Otherwise give it for three consecutive mornings, then skip two, and begin again. Perseverance through six weeks will commonly effect a cure, or, at the least, sensibly mitigate discomfort.

Another vermifuge is the root of the so-called "male fern," which produces no spores. Only an accomplished herbalist rightly knows the male fern from the perfect one, but, if it can be found, the root makes a tea excellent for worms. Dig in May, wash and dry, and, when wanted, slice and steep for some hours in hot water. Give a tumblerful at night, and another upon rising. But neither the pumpkin-seed nor the fern-root is so helpful in many cases as wormwood *(Artemisia Absinthum)*, which is an aromatic tonic as well as vermifuge. Both leaves and stalks are as potent as the flowers. Gather

while in flower, dry, keep dark, and brew tea by steeping —not boiling. Make it so strong a wineglassful will be a dose. Treat Indian pink-root in much the same fashion. Botanically it is *Spygelia Marilandica.* It grows wild in rich shady woods, flowering in late May or early June. Dig the plants whole, and let the tops wilt before cutting them away. Wash and dry the root, which is an active and excellent cathartic as well as vermifuge.

For Sore Mouths and Disordered Stomachs

A disordered stomach means commonly a torpid liver. *Taraxacum Officinalis,* the common dandelion, is a liver specific. Use the root either alone, in tea or tincture, or combined with hops, or with dogwood and wild-cherry bark, or yellow poplar bark. Either mixture will commonly set things to rights. But, if there is fever and sore mouth, use instead yellow puccoon *(Hydrastis Canadensis),* which grows wild in rich shady woods from Canada southward. Aside from its medical virtues, it has the curious property of dyeing linen a bright yellow, though it scarcely stains either cotton, or silk, or wool. The Indians used it in dyeing their finest baskets, as they likewise got red from the root of the dogwood *(Cornus Florida).* Good yellow puccoon-root is fine and fringy, of a bright golden-yellow, and, when fresh-dug, a bitter —almost acrid—smell. It grows delightfully fragrant by keeping a few months. If the smell is lacking, reject the root; it is inert from long lying. It can be either chewed or made into tea, brewing it fresh as needed. It is intensely bitter, but, medicinally, tonic, alterative, laxative, and diuretic; hence especially indicated for a clogged and sluggish system. If there are pains all about, and rheumatic indications along with the sore

mouth, make a bitter of the yellow puccoon and black-snake-root. Infuse a handful of each for three days in cold water, then strain, mix, and add an equal quantity of whisky. Give a wineglassful as often as the stomach will bear.

Calamus-root *(Acorus Calamus)*, sweet flag, is a good thing for mild dyspepsia, being lightly tonic, laxative, and stomachic. It clears the voice, and is further useful as a flavouring for bitters less agreeable. Thus it can be gnawed from the lump a little at a time, when more powerful medicines would turn the stomach. Queen's Delight *(Stillingia)*, for example, though a fine alterative cathartic, is also an emetic, hence must be administered with the utmost caution.

Bone-set, or thoroughwort, botanically *Eupatorium Perfoliatum*, got its common name from curing "break-bone fever," the most dreaded disease of pioneer days. It is an excellent bitter for all sorts of catarrh, especially catarrh of the stomach. Both lavender and valerian relieve stomach troubles with nervous complications. Both can be used as either tea or tincture, but can be so easily bought perfectly prepared, it is best to depend on the druggist.

Colic, Diarrhœa, and Dysentery

Tea made of persimmon bark is both astringent and cooling. But it is not so effectual as oak-bark water. Take the fine inner bark of either red or white oak, the fresher the better, infuse it in cold water three hours, and drink freely. This will check any ordinary diarrhœa. White walnut and wild-cherry have been already named. Fresh grape-leaf tea is a mild and safe astringent. Carraway seed in tincture ease colic pains. So does mild red-pepper tea, especially if supplemented with a pepper poultice over the stomach.

For Coughs, Croup, and Convulsions

Lobelia (Indian tobacco), a quick and safe emetic, also an excellent expectorant, is handy to have about where there are children. With red puccoon *(Sanguinaria Canadensis)*, it is especially useful in cases of croup. As red puccoon is, further, a good laxative and expectorant, it comes in well for all sorts of feverish cold. It is a curious-looking plant with compound three-lobed leaves, dark green, richly mottled with red. Where the leaves join, there is a dull red upstanding flower which country children call Jack-in-the-Pulpit. In the fall this flower is succeeded by a cone-shaped clump of brilliant scarlet berries, only less gorgeous than the berries of Indian turnip.

Indian turnip is an excellent remedy for colds, especially those with an obstinate tendency toward the lungs. Bulbs fresh from the earth are best, but dry ones will answer by soaking. If the case is urgent, scrape the root, and swallow a pill of it; it is hotter than fire, but healing. Make either syrup or candy by boiling the roots to a strong tea, and adding sugar—maple-sugar if possible. If it is left as syrup, put whisky or brandy well burned into it, one-third spirits to two-thirds syrup.

Elecampane and cumfrey, both well-known garden-herbs, make another fine cough-syrup. More properly it is a cough-jelly; the fresh roots are pounded with their own bulk of loaf-sugar and good burnt brandy mixed well through the mass. Put one spoonful of brandy to three of the mixture, stir well, and keep closely covered. Make in small quantities, as it is better when moderately fresh.

Rue makes a tea almost specific for infantile convulsions. Dried leaves are as good as green, hence should be kept on hand. Pure indigo is another thing good for convulsions; it is so quick and safe an emetic. But it is

unwise to use ordinary commercial indigo, since it is largely subject to adulterations.

For Gout

Gout, which has at least a thousand manifestations, has also palliatives, some of them even reaching the dignity of cures. Cure is largely a matter of constitutional idiosyncrasy, which can only be determined by experiment. Some sorts of gout are helped by buttermilk. Drink a quart of it, freshly churned and wholesome, every twenty-four hours. Three quarts will be better, capacity permitting. Eat, while drinking buttermilk thus medicinally, no raised bread, pastry, salt meats, sweets, nor highly spiced dishes, and drink no wine. If any stimulant is needed, let it be the very best whisky taken in distilled water, half and half, and that as sparingly as possible. Eat white meat, eggs, green vegetables, and either corn bread, or graham crackers, or whole-wheat bread, or very good soda-biscuit. Nothing heavy should go into the stomach. Thus the lactic acid of the milk gets its chance to work. It enters the blood, and helps to dissolve earthy deposits. Then, by stimulating all the excretories, it enables the system to throw off poisonous waste.

Very painful gouty joints may be helped by burning thus with turpentine: Cover the joint with soft old flannel, wet the flannel well with turpentine, lay a folded cloth over it, and iron with a hot iron as long as it can be borne. The heat vaporises the turpentine, and drives it into the skin. The resulting burns, though painful, have a healthful counter irritant effect. For a lame back or shoulder, try a rosin plaster. Melt the rosin with half as much lard, and spread while hot on soft thin leather. Warm and apply over the sore joints. It will stick very tight, and should be left to wear off. A clay poultice—either

very fine red clay or well-burned yellow clay—helps sore knees, ankles, and wrists. Pulverise and sift the clay, then wet to soft mud with strong apple-vinegar, and lay on an inch thick, binding it in place with soft old linen. Leave on until dry. Repeat the poulticing every night for a week, then skip three days. For a gouty foot, fill a stout sock, very much too big, with the wet clay, and thrust the foot down in it. If gout attacks the finger-joints, enlarging them very much, the lead bandage may give some relief. Beat out a bullet flat and thin, then bend it around the enlarged joint, lapping one end over the other. Keep in place with a stall, and, as the swelling underneath goes down, gently hammer the lead smaller, lapping the ends more and more. Hop poultices will relieve racking gouty pains. Half-fill a thin bag with hops, drop it in boiling water, wring out, protecting the hands with a folded towel, and lay upon a folded flannel over the painful spot. Cover with another flannel, and leave in place till cold. The same hops may be reheated a dozen times.

Grape sap, caught in a wooden vessel, and drunk instead of water, is another gout cure more or less efficacious according to constitution. A healthy vine, preferably a wild vine, should be chosen, and notched in deep rather than cut off. In the spring such a vine will drip more sap than the thirstiest patient can drink. It is said to have even greater solvent powers than buttermilk; hence its value.

Chapter *EIGHTEEN*

The Family Sewing, Plain Sewing

PLAIN sewing threatens to become a lost art; very much more's the pity. Perfect needlecraft is a liberal education to the eye, the fingers, and the sense of proportion. Moreover, there are few things a house-mother may practise to more profit, either artistically or financially.

Practically there are but four seams, though in execution they may be almost infinitely varied. First comes the over-seam. Commonly it joins selvages, or else hemmed edges with inset ribbon or lace. This is also the carpet-stitch. Carpet-sewing, of course, means a big needle and the very stoutest flax-thread, double and well waxed. Match the figures ahead of the needle, and make them fit, even though the fitting demands a slight puckering. Take shallow hold, never more than a quarter-inch, setting the needle in the farther side, and thrusting it well through before attempting to pull it out. Make regular stitches, and be careful not to draw one tight enough to crease the selvage, yet leave the next loose enough to stand slack upon top of it. That makes a zigzag wabbly seam, which causes puckers, wrinkles, and wear of the laid carpet.

For anything else than carpet, use rather a fine needle, and thread proportionate. Thus the work is much easier; the resultant seam much neater. Pin the edges

together six inches ahead; this insures against holding one fuller than the other. Take neat short stitches of even depth, and as shallow as will hold. After a seam is finished, separate the parts, and smooth the join hard upon the wrong side with the end of the thimble. The shorter and more regular the stitches, the daintier the joining. It is especially useful for infants' skirts—indeed, for all infantile belongings—for bed and table furnishings, and for very fine night-clothes and underwear.

Felled seams are first sewed with the back edge standing higher than the front one; then the standing edge is folded under, hem-fashion, and whipped down to the body of the garment. Machine-felling is possible to an expert operator, but is nothing like so desirable as hand-felling. The first sewing up may, however, be done on the machine. Trim away all rough edges and ravelled threads before beginning to fell, and, as in over-seam, use fine needles rather than coarse ones.

A simple raw seam is either stitched or run, keeping the edges even, and not holding one in to the other. Stitched seams are sometimes opened flat and kept flat with lines of herring-bone stitches. This is a good finish for the seams of boys' summer-trousers, as it strengthens the join, yet leaves it elastic. Run seams with selvages need no other finish. With raw edges it is wise to whip them sparsely from top to bottom.

For underwear and white goods generally, the bag seam is recommendable. To make it, first sew a very narrow seam to stand up on the right side, then turn the garment, fold it evenly along the first seam, and stitch a second line the eighth of an inch from the edge. This comes next to felling, and is often preferable, in that all the work can be done on the machine. Still, upon very fine textures, and particularly with sloped or rounded edges, it is best to run the first seam, taking short, very even, stitches. Excellence in any kind of running means

keeping the thread straight, so as to make a seam of even depth, and having the stitches the same length, not alternately short and long. The length should be proportioned to the fabric sewed. Take up four to eight threads of it, and skip as many. Counting would be a tedious waste of time. Count for the first stitch, and use that as a pattern.

Hems are of three sorts—rolled hems, flat linen hems, and the ornamental hem-stitched ones. A ruffle, a towel, napkin, sheet, or anything similar, ought to be torn or preferably cut by a thread. This, of course, does not apply to bias frills of silk or stuff. Fine ruffles of lawn, linen cambric, or mull, should have a thread drawn, and be cut with very sharp scissors. Over-seam the breadths as neatly as possible, then begin at one end and make a tiny roll at the upper edge, manipulating the cloth betwixt the right finger and thumb. With the very finest needle, and No. 100 thread, sew down the little roll with even, very short stitches. If the hem is to be trimmed, as with narrow edging, tatting, or beading, it makes the trimming more effective to herring-bone it to the roll instead of sewing the roll down. Fasten the thread firmly to the rolled edge of the ruffle, then pass the needle through the trimming, draw the thread after it, but leave the roll and the trimming-edge a twentieth-of-an-inch apart. Now fasten the thread in the trimming with a tight button-hole stitch. Hold the two edges evenly apart with the left thumb and forefinger, and join them with herring-bone stitches, setting the needle upon the cloth side well within the roll. To herring-bone, simply throw the thread from the needle forward, so the point comes up behind the thread drawn down.

A linen hem has the raw edge turned down first, then the hem proper, and is creased a third time even with the edge of the hem. By sewing through the two edges, as in over-seam, it is possible to take very neat stitches

without pricking the fingers in the least. If hem-stitch is undertaken, threads should be drawn not merely for cutting, but for both creases. After the hem is creased the right depth, draw three or five threads exactly even with it. Begin at one end, gather up three threads in the drawn space, let the needle-point come out over the thread which is held forward, then pass it up into the loose edge of the hem. Draw it down tight, and repeat all the way, taking care never to vary the number of threads in the knots.

Button-Holes

A button-hole is a sort of sewing shibboleth. Many seamstresses bungle them horribly. Hence the vogue of machine-worked button-holes, which are, however, at their very best inferior to good hand-work. Good twist, which will neither fray nor kink, is essential to good button-holes. So is clean cutting. A ragged, chewed edge can never be made to look well. Mark the button-hole spaces accurately with chalk—not only the distance apart, but the size. Where choice is possible, cut them to run straight with the threads, either warp or woof, or else on a true bias. Use twist that is fine rather than coarse, and a needle that carries the thread easily, so there shall be no pulling. Begin at the back, fasten the thread firmly, pass it directly along the cut edge to the other end, take a very short stitch there, and carry it back to the beginning, letting it lie along the other cut edge. Now take the button-hole firmly between the left thumb and finger, holding it so a cut edge projects say a quarter-inch. Stick the needle through this edge point inward, then take up the thread just behind the eye, and lay it lightly around the point. Draw out the needle, and tighten the stitch so the looped thread covers the cut edge. Repeat, keeping the stitches all the same depth

until the other end is reached. There, if the garment is a coat or jacket, set the stitches round in eyelet fashion. For any other garment, let them end square, turn the work, and begin afresh on the other side. Button-holes likely to have heavy wear are better if a double flax-thread is laid along the edge and around the corner, so as to be worked over. But, whatever is done, deft-handedness is the real essential. A button-hole once bungled is a button-hole forever spoiled.

A Sewing-Room

Every home needs a sewing-room, permanent, if possible, but at any rate throughout the stress of spring and fall work. Even to the woman who does her own sewing, it is a boon beyond calculation. Until it is tried, one has no idea what comfort lies in having things right at hand when needed, nor in knowing that they will stay there until all need is past.

A spacious airy place is, of course, much the best. Failing that, a small room is better than none at all. A north light is preferable; it gives the longest daylight and the least strain on the eyes. With a small room, take out all the furniture not actually required, and fill its place with sewing requisites.

They are neither many nor costly. The first is a sheet of unbleached muslin, big enough to cover the whole floor. Sew the seams firmly, hem the ends, and fasten it down with drugget-pins in each corner. Set the sewing-machine in the handiest place where a good light will fall over the operator's shoulder. See that the chair for it is the right height, also that it is light and free of obtrusive angles and knobs. A bent-wood chair is on many accounts the best. If it is too high for comfort, have the legs sawed off.

Always clean a machine thoroughly before beginning

a sewing campaign. The first thing is to deluge every working part with kerosene, and leave it several hours. Then wipe off the kerosene with a clean flannel, rubbing hard if gummed oil remains. Wet the treadle-joints again with kerosene. If the upper works still show dirt and grime, and particularly if they run hard, take them off and boil them twenty minutes with a handful of washing-soda in the water. Rinse by pouring boiling water over, under, and through them; it is best done from the spout of a tea-kettle. After rinsing set in a hot place for half-an-hour. Next put the works in place, oil plentifully with the very best machine-oil, run at top speed a minute, then wipe off superfluous oil, tighten up nuts and screws, see that the feed is unclogged, and that the presser-foot stands true; also that the needle is properly set, and the machine is ready for use.

Fasten to the wall, back of the machine or beside it, a set of hanging pockets, at least a dozen in number. Mark each plainly with the sort of thread it is meant to hold, as "Black Silk, No. A," or "White Cotton, No. 60." At bottom of the pockets hang a book of flannel leaves numbered from one to ten, and holding needles of sizes to match their numbers. Another set of marked pockets, for bindings, stay-casing, buttons, hooks and eyes, crayons, chalk, basting-cotton, and so on, should be put up on the wall where it can be reached from the low sewing-chair provided for hand-work. If the low chair has rockers, all the better; only they must not be aggressive. Each set of pockets can be backed with a square of denim. Sew small brass rings to the corners to slip over screw-hooks in the walls. Thus they can be put up without defacement. In a permanent sewing-room it is helpful to tack up on the wall the plates after which the garments of the moment are to be fashioned.

Two more bent-wood chairs, a folding cutting-table, a low dresser with big mirror and broad shallow drawers,

should also find place in the sewing-room. Set apart one drawer for linings and findings of all sorts, as crinoline, whalebone, wadding, and canvas. Keep another drawer for uncut stuffs, and a third for unfinished work. A bigger table with drawers and folding-leaves, for cutting big things like skirts, is a very present help, space permitting. In the table-drawers keep shears, small scissors, a whet-stone, several tape-measures, and at least half-a-dozen thimbles. Thimbles seem endowed with a certain malign intelligence, and lose themselves past finding if their loss stops work. If it is, through plentiful substitutes, a matter of no consequence, they discover themselves upon the least provocation. Set this big table against the wall if possible, and just above it swing a broad flat pocket sacred to patterns. Fold each pattern flat, and keep it in a separate big envelope plainly marked with sort and size. Always press a pattern smooth with a warm, not a hot, iron before using it. If a hot iron must be used, let the pattern lie a while, so it will not cling and curl troublesomely to the hands.

There should be two smoothing-irons, one heavy, one light, with either wooden or asbestos-covered handles. An oil-stove is the best thing to heat them with. Properly managed, it makes neither smell nor soot. It has the great advantage over gas that it can be set wherever it is most convenient. A wooden box a foot or so square will hold both the stove and the irons. By tacking sheet-tin over the top, which must be hinged on, it makes a good resting-place for the lighted stove.

Irons presuppose a press-board, which is an ironing-board in miniature, with rounded ends and rounded edges over which to shape the most obviously crooked seams. Cover the press-board with gray flannel, to be removed and washed once a year. In addition, have a white cover, cotton or linen, to go over the flannel when dainty colours must be pressed.

A lap-board, with a yard-measure marked on the top, is a great convenience. Set it up back of the low sewing-chair, but in easy reach. From one arm of this chair hang a small, compact pin-cushion cram-full of sharp clean pins and big-eyed basting-needles. From the other suspend a small closed box with a slit cut in the lid, and the end of a reel of basting-cotton pulled up through the slit. Basting-cotton has even more than the thimble's knack of losing itself. It is a wary seamstress, indeed, who gets around both.

Small things, as yokes, straps, gussets, and so on, have the same amiable propensity. The white sheet on the floor effectually balks it. Further, it helps the eyes by diffusing and prolonging a soft equal light. Incidentally, it saves the carpet or the floor from lint, and makes the occasional brushing up very much easier.

There are just two more absolute sewing-room requirements—a covered wicker-basket for scraps, bundles, and general odds-and-ends, and a light but commodious waste-basket. A folding clothes-horse, to hold work in hand, is desirable. So is a big separate mirror that may be turned at any angle, and a form for fitting and draping.

Even where the house-mother does the sewing, it is a great waste to skimp in findings or thread; indeed, in any small requisite. With a hired seamstress, such waste is not only cruel, but wicked. She must be paid for her time, and often loses more, piecing and contriving how to make five cents' worth answer for ten, than would half-finish a garment. This applies with double force to making over old garments. If it needs must be done, have everything unpicked, sponged, pressed, even dyed, before the dressmaker comes. It is well, further, to make up one's mind as one unmakes a frock. Waiting for the seamstress to make up both together is generally costly and seldom satisfactory.

As to Patterns

Patterns have their uses, oftener their abuses. No woman should permit herself to depend wholly upon them. Certainly never after she has owned and worn out one perfectly cut and fitted gown. Patterns are arbitrary, not to say absolute, whereas the human form is a varied and ever-varying entity. Moreover, figures can and do lie amazingly—when they are supposed to indicate pattern sizes. Patterns are cut for the average of measurements, hence are as unindividual as a composite photograph.

Given accurate measurements, a good tailor has before him a problem to be worked out mathematically. For example, with a waist measure of twenty-six inches, he understands that two-and-one-half of those inches must go into the back forms, whose combined breadth must exactly equal that of the side forms next it. With a smaller waist the back forms might be two inches, with a larger one, three, with corresponding increase in side-form breadth. A thirty-eight or forty inch waist would necessitate extra side forms. A very stout figure may take five instead of the usual three. Further, these side forms must be the same width from waist-line to arm-hole. The swell of the figure, no matter how redundant, is accommodated by the slope of the back forms and the fronts. In the fronts the darts must be so set that the breadth from the under-arm seam to the first of them is just that of a side form. Darts running up to a high bust need to be closer together than those taken low. When the bodice is fastened, the space from one dart to its fellow opposite ought to be just half-an-inch greater than the breadth of the two back forms.

With a well-fitted old frock, rip one-half the waist carefully apart, and leave the other half intact. Press the ripped parts very smooth, first putting a line of short

white stitches to mark the old seams. Fold the new stuff right sides together, and lay it smooth upon a table or cutting-board. Arrange the pieces of the old waist upon it, taking special pains to have the warp and woof threads run the same in new and old. Weight the old bits in place, then run a tracing-wheel along the lines of white stitches, bearing very hard. Next brush loose chalk along the wheel's track; it will go through and leave a line of fine white dots underneath. Take off the pattern pieces and cut out, keeping your scissors, which ought to be sharp and clean-cutting, an inch outside the line of dots. Cut the lining from the outside, but let the warp threads run around instead of up and down. In cutting from a paper pattern, instead of an old garment, it is well to try the pattern first on cheap plaid gingham, placing it so, when the pieces are joined, the plaids will run straight one with another. Indeed, with a pattern used many times over, it pays to paste the pattern on the gingham and cut it out. Unless the warp threads run perpendicular, and the woof straight around the waist, a tight bodice will pull out of shape and sit awry no matter how carefully it is boned.

Beware of skirts or skirt-patterns with a wide apron, very wide hip-gores, or many seams that bring bias edges together. Skirts so shaped, either lined or unlined, stretch and sag distressingly at the least wear. Always stay bias-skirt seams with a straight strip, or tape, or ribbon. In choosing skirt-patterns for goods with a nap, as cloth or velvet, beware of the so-called circular effect which makes the nap run up one side, down the other, and crosswise in front. A garment so cut requires either a corkscrew or a cyclone to brush it properly. The cyclone may develop in the wearer's spirit after a little experience.

Fitting, Boning, Hooks and Eyes

Tailor-finish so-called means sewing up the waist single, boning it, and applying a lining after. Or the process may be reversed. With a waist cut as directed, baste the seams by the dotted lines, sew up, press and bone, all but the shoulder-seams and those under the arms. In pressing woollen stuff, remember not to wet it; it draws enough moisture from the air, and water makes it look shiny. Baste the unsewed seams to stand upon the right side, try on, and pin up any slack until the fit is snug. Then hold the pinned lines firm, and mark them with chalk. Take off the garment, unpin it, and put lines of basting-stitches in the chalk-marks. Next trim away surplus stuff, always leaving a good seam. In basting up the shoulder-seams, stretch the upper half of each front as much as possible, and hold the back slightly full to it. No matter about puckers; they come out for pressing. By thus stretching the fronts, the ugly and troublesome wrinkles either side the collar are wholly done away with. If the lining is fitted instead of the outside, the same end is attained by taking a seam the eighth of an inch deep, and three inches long in the fronts, letting it begin just in front of the shoulder-seam, and extend toward the bust.

Notch all seams well before pressing, but take care the notches do not go too close. Lay an extra thickness of flannel over the press-board, and never have an iron hot enough to give even a smell of scorching. If in haste, lay a strip of waste cloth over the seam to shield it from an iron too hot. Great heat is, however, inimical; a quick-moving iron cannot give the shaping which pressing is intended to accomplish.

Hold stay-casing next to you, and put it on very full, leaving several inches free at both upper and lower ends. The sewed part should not come nearer than three inches

to the arm-holes. Soak whalebones until they are soft enough to sew through. Push them in from the bottom, cover two inches with the free tape, then sew through and through bone and casing, push the bone in hard, sew again two inches lower down, and again at the waist-line. This pushing in makes the bones curve in such fashion as to stretch the waist and hold it unwrinkled.

The great thing about hooks and eyes is to have them match accurately. One way of achieving that is to pin the edges together, mark them across with chalk at proper distances, and take a loose whip-stitch from one mark to another. Then pull the edges apart, and clip the stitches, leaving an end each side. Another way is to snip holes in a strip of cambric, lay it on the wrong side of each piece, and brush loose chalk over the holes. Still another, perhaps the easiest to a good needle-woman, is to sew on hooks as they appear to be needed, then slip an eye over each hook, and sew them on to match.

Applied lining should always stand a little loose, but not enough to be clumsy. The seams in them should be sewed a trifle larger than those in the outside, and all allowance made at the edges. Silk-waist linings, so long the hall-mark of fine frocks, are in a measure out of vogue, as they do not stand wear and perspiration to match the firmer linens and cottons. It is well to baste together the seam-edges of linings and outside at the shoulders. At neck and waist the two, of course, are faced together.

In making up a lined bodice, lay the gown stuff right side down upon the lap-board, put the lining over it, and join the two by a perfectly straight line of basting where the waist is to be. Push the lining faintly full toward this basting both above and below, and baste two more lines each about half-an-inch from the first. Then baste together all the way. After all the pieces are lined thus, baste up the seams, and fit as in tailor-making.

Skirts

With a new skirt-pattern, especially if it is to be made up in costly stuff, it is well to cut and fit the lining first. If there is no lining, shape the skirt in cheap lawn or paper muslin, and fit it accurately before putting scissors in the frock proper. Try on the false skirt. If it hangs loose at bottom in front, the apron is too flaring, and must be narrowed. If it bulges over the stomach upon sitting down, there is need of more fullness there, which is best gained by taking in the seams either side and enlarging the hip-darts. A skirt that binds at the foot in front is too straight. Have another person rip and snip and pinch about the trial skirt until the wearer, standing before the mirror, is satisfied with the hang of it.

Thin frocks are best made with a drop-skirt; that is to say, a lining shaped to themselves, yet loose except at the belt. Linings of all sorts are better made separate and put inside the skirt. If stiffening is needed, cut it on a true bias, and stitch it firmly to the skirt-lining. Put lining and skirt even at the top, seam on seam, baste the seam-edges together half-a-yard down, fasten the basting-ends very firmly, then shake the two skirts well together, and baste around the bottom. The lining had better be a little loose. Otherwise, it may pull and drag the outside.

A walking-skirt has commonly lapped or stitched seams. For the lap, cut the edges very smooth, lay one upon the other, lapping an inch, and baste firmly together. Stitch as close as possible to the outer edge on the right side, and again three-quarters-of-an-inch from that. Such a skirt needs only a braid binding at bottom, but may have a shaped facing sewed on, turned over exactly at the seam, basted up on the wrong side, and stitched in place with one or many rows. The stitched seam, which is worth practising, because it appears on so many things,

is first sewed up in ordinary fashion, then opened and each side stitched down anew as near the edge as possible. This is an excellent finish for children's cloaks, and woollen garments generally.

To make a neat, almost invisible front placket, baste up the whole seam, but begin stitching at the placket level. Press throughout, then rip out the basting, slip a thin strong tape under the pressed edges, sew on hooks and eyes, then face the front with silk of the same colour, and set on the other side a pinked fly of the skirt cloth to lap at least two inches and a half under it. Ripping at the placket-bottom may be made impossible by doubling a small square of silk and setting it, gusset-fashion, across the end of the seam. Plackets or pockets anywhere can be finished the same way. Unless the hooks are very small, it is best to cover the eyes with silk button-holing, or else to use silk loops in place of them.

For the Little Folk

It was a wise mother who said: "I try to give my children just enough clothes every season to wear out well." With a succession of olive plants through which garments can descend as they are outgrown, it may be worth while to spend much time and strength on them, but most commonly such spending is a waste. Plain clothes, well shaped, clean, and in full supply, are worth all the finery that ever fluttered to the torment of little hearts and the discomfort of big ones.

It is positive and unspeakable cruelty to swathe a newborn baby in things stiff with tucks and embroidery. A baby's skin all over is more delicate than that of a grown-up eye-lid. The eye-lid is the test for an infant's wardrobe; whatever hurts, or is even unpleasant to it, ought to be thrown aside. Even the softest stuffs are sold with more or less dressing in them. They should be well

shrunken in boiling water before making up, and then after making thoroughly laundered, without a trace of starch. Further, they ought to be ironed with warm, not hot, irons, as the hot ones give a sort of crackly surface. Make the first long clothes as simply as possible. No other trimming than a fine lace-edge at neck and wrists is comfortable, and none other is therefore permissible.

Almost the same may be said of short clothes. Lawns, muslins, gingham, are all the better for shrinking before making up. Flannel need not be wet, but should not go next new-born skin. Shirts coming well down around the hips can be knitted loosely on fine steel needles from the softest white wool. Do not use Saxony; it is too wiry. Even in Shetland there is a choice—to be determined by the eye-lid.

For children of larger growth the most that can be said is that the essential points are simplicity, symmetry, and freedom to develop their growing bodies. Frocks with tight belts have robbed childhood of joyous centuries. They ought to be forbidden by special enactment, as it should be further forbidden to put a mourning garment upon a little child.

Vagaries of the Machine

Sewing-machines have moods quite as unmistakable as those of their owners. Sometimes, for no reason in the world, one refuses to sew a particular stuff, no matter how it is presented, thick or thin, single, double, or in gathers. Occasionally it is a very thin stuff which is thus repudiated. The best remedy is to lay a slip of paper each side the offending seam, slip it under the presser-foot, and sew with steady force. After sewing, the paper can be pulled off.

Sometimes the feed refuses to take hold upon shrunken

white goods, though more commonly shrinking is a betterment as regards sewing. In that case, it is well to wet the seams with starch-water, and press them dry before trying to sew. It is troublesome, but less so than wrestling with a contrary machine. White stuffs with much dressing in them, loaded silks, and wiry woollens, are also apt to occasion trouble. For the white stuff, rub the seams with soap; for the silk, use a bit of wax; for the wool, a soaping, with waxing afterward. This when the fault lies unmistakably with the texture. Half the time, at least, when a machine of good make goes thus half-way on strike, it will be found that something is wrong—it wants oil in a vital spot, or the feed is clogged with lint, or a screw or nut is too tight or too loose. Make haste slowly by looking for the flaw, and at once remedying it. Time can in nowise be better expended.

Patching, Darning, and Mending

Patching, darning, and mending deserve a separate chapter; they can be no more than glanced at thus at the tag-end of so much else. All three may be brought almost to the level of high art. Indeed, it is an open question as to whether or no they constitute the real test of needle-craft. A thing worth patching at all is worth patching well; still, there is something to be said for the view of a good deacon who explained that by the parable of old wine in new bottles: "Our Lord meant to enforce the great truth that *sometimes a hole will last longer than a patch.*"

Patching by machine is wholly possible. It is, in fact, the best way of patching any big rent that can be mended flat. Cut a patch amply big, and baste it under the rent, so the threads will run with those of the thing to be mended. Stitch a row all around the patch, an inch from

the outer edge. Next turn under the raw edges neatly, and stitch them down. Now reverse the work. Cut out the rent, leaving a three-quarter-inch margin next the first row of stitching. Cut half through it at the corners, turn under the edges, and stitch them down.

To patch the trousers of a small boy or a big one at the knee, rip up the outer seam well past the hole, cut out the worn part square across the leg, set in a new piece matching thread to thread, stitch it firm, press the seams flat, then sew up the leg-seam, fasten, and press.

White stuff, when it begins to break, seldom pays for patching. But shirts worn only around the neck-band may have their lease of usefulness almost doubled by putting on new bands. They must be washed free of starch first, and the old bands carefully ripped, not cut off. White garments, snagged or burned in wash, are best patched by hand. Slip a patch under the rent, then baste both upon a piece of stiff paper or linen. Cut the torn part to smooth square or oblong edges, notch lightly at the corners, turn under, and hem down. Take from the paper, and hem down the other side, making the join as near as possible like a broadish flat fell.

To darn small holes in lawn, linen, or damask, baste the hole firmly over waxed linen; then, with a very fine needle and ravellings of the same stuff, go back and forth, letting the threads touch until the hole is covered. Take up the stitches at each end in a straight line, and barely cover the hole. Weave other threads across this first line, going under one, over one, as in the original fabric. If the work is well done after pressing, the spot will not show. The same method answers for soft unpatterned silk. But for glacé silks and brocades, though effectual, it is more apparent.

To darn cloth, no matter how jagged the tear, lay the torn edges so they will touch and baste in place over a soft thin woollen, such as cashmere or nun's veiling.

Then fasten it smoothly over waxed linen, and darn the rent in and out with very fine silk exactly matching the colour. Use also a very fine needle, take short stitches, and go across very close. There should be at the least thirty cross-threads to the inch of darn. Fifty is better still. But they must be so set as not to pucker or raise a ridge. Trim off all loose threads from the right side, lay the darn face down upon a blanket, cover it with a damp cloth, and press very hard with a heavy, hot iron. If the darning is well done, it ought to be invisible for at least three months after the pressing.

Silk ravels so it is ill to mend in any fashion. It may be darned zigzag and last, but wears the usual appearance of premeditated poverty. In darning the yawning rents of children's stockings, it helps to stretch coarse net over the holes, catch it on around the edges with a few basting-stitches, then weave the darning through its meshes. But for knees, and sometimes for heels, patching is better than darning. Cut the worn place square, and big enough to cover the knee-cap, ravel out the stitches at top and bottom, and make roll-hems down the sides. Do the same things to the patch, first fitting it exactly. Whip the hemmed edges together, and join the ravelled ones, by sewing rather loosely through a stitch at a time in each side. This makes a seam nearly as elastic as the stocking, and gives that article a new lease of use.

Rugs and carpets can be darned to manifest advantage. Lay a bit of stout but sleazily woven woollen upon the wrong side of a rug, fasten down the frayed edges with casual stitches here and there, then darn thickly back and forth, using the largest-size embroidery needles and either wool, silk, or flax of a harmonious colour. Darn threadbare spots in a carpet on the floor with ravellings in a fine curve-ended upholsterer's needle. If there are moth-eaten spots in Moquette or Turkey carpets, match

the colours as near as possible in soft fine wool, cut the wool into short lengths, and sew the tufts to the carpet with fine twist or flax, drawing the stitches so tight the wool stands up each side. When the spot is well covered with the tufting, trim it smooth with very sharp shears. Stair-carpets may be darned across the worn places, filling them with coloured wool, and then tacked, so the darns come on the rises, not the treads.

To inset a patch in a carpet on the floor: Mark the limits of the patch before taking up that part, cut it out as soon as loose, and match the figure in the patch by it. Leave the patch an inch-and-a-half bigger all round. Cut through the corners of the hole diagonally for three-quarters of an inch, double back the cut edges, and seam in the patch. Press the seam hard with the heaviest iron at hand before tacking down.

THE END.

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